Series 1959, No. 28

Issued October 1963

SOIL SURVEY

Penobscot County Maine

OUR SOIL • OUR STRENGTH

UNITED STATES DEPARTMENT OF AGRICULTURE
Soil Conservation Service
In cooperation with
UNIVERSITY OF MAINE AGRICULTURAL EXPERIMENT STATION

HOW TO USE THE SOIL SURVEY REPORT

THIS SOIL SURVEY of Penobscot County will serve several groups of readers. It will help farmers in planning the kind of management that will protect their soils and provide good yields. It will assist engineers in selecting sites for roads, buildings, ponds, and other structures, and it adds to our fund of knowledge about soils.

Soil scientists studied and described the soils and made a map that shows the kind of soil everywhere in the county. The base for the soil map is a set of photographs taken from an airplane. Fields, woods, roads, and many other landmarks can be seen on the photographs.

Locating the soils

Use the index to map sheets to locate areas on the large map. The index is a small map of the county on which numbered rectangles have been drawn to show where each sheet of the large map is located. When the correct sheet of the large map is found, it will be seen that boundaries of the soils are outlined in red and that there is a red symbol of each kind of soil wherever it appears on the map. Suppose, for example, an area located on the map has the symbol BaB. The legend for the detailed map shows that this symbol identifies Bangor silt loam, 2 to 8 percent slopes. This soil and all others mapped in the county are described in the section "Descriptions of the Soils."

Finding information

The report has special sections for different groups of readers. The section "General Information About the County," which discusses early history, climate, industry, and other subjects, will be of interest mainly to those not familiar with the county.

Farmers and those who work with farmers can learn about the soils in the section "Descriptions of the Soils," and then go to the section "Use and Management of Soils." In this way they first identify the soils on their farms and then learn how these soils can be managed and what yields can be expected. The soils are grouped by capability units; that is, groups of soils that need similar management and respond in about the same way. For example, Bangor silt loam, 2 to 8 percent slopes, is shown to be in capability unit IIe-3. The management needed for this soil will be found under the heading, "Capability Unit IIe-3," in the section "Use and Management of Soils." A list at the end of the report gives the name of each soil, the page where it is described, the symbol of the capability unit in which it has been placed, and the page where the capability unit is described.

Soil scientists and others interested in the nature of soils will find information about how the soils were formed and how they are classified in the section "Genesis, Classification, and Morphology of Soils."

Engineers and builders will find information that will assist them in the section "Engineering Uses of Soils."

People who are interested in growing trees will find woodland suitability groups of soils described in one section of the report.

All users will find information about the soils and their management in various parts of the report, depending on their particular interest. Those interested in general soil areas will want to read the section "General Soil Map." That section tells briefly about the principal patterns of soils, where they are located, and how they differ from each other.

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Fieldwork for this survey was completed in 1958. Unless otherwise indicated all statements in the report refer to conditions in the county at that time. The soil survey of Penobscot County, Maine, is part of the technical assistance furnished to the Penobscot and Southern Aroostook Soil Conservation Districts. The publication is a cooperative contribution from the Soil Conservation Service, and the Maine Agricultural Experiment Station of the University of Maine.

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SOIL SURVEY OF PENOBSCOT COUNTY, MAINE

SURVEY BY KENNETH V. GOODMAN, RICHARD M. RILEY, BRUCE A. WHITNEY, JOHN R. ARNO, KENNETH J. LA FLAMME, S. VON DAY, AND J. S. HARDESTY, SOIL CONSERVATION SERVICE, AND D. B. LOVEJOY AND BRUCE WORCESTER, UNIVERSITY OF MAINE AGRICULTURAL EXPERIMENT STATION

PENOBSCOT COUNTY is situated approximately in the geographical center of Maine (fig. 1). Its total

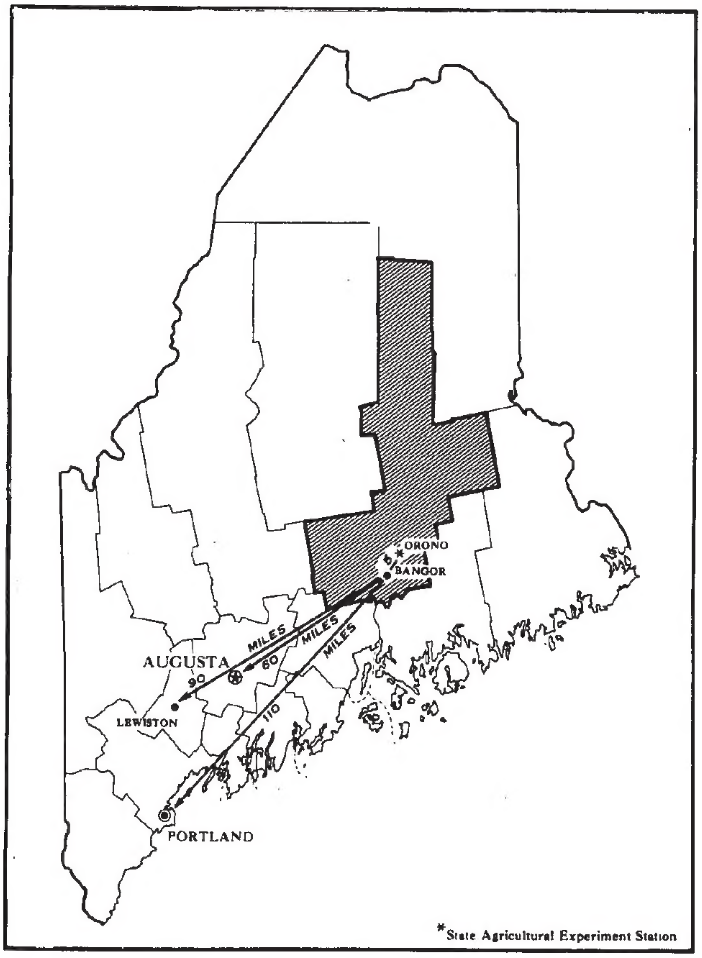

Figure 1.—**Location of Penobscot County in Maine.**

length is about 110 miles, and its width, on an angle across the two wings, is about 75 miles. In the extreme northern part it is about 20 miles wide. The area of the county is 3,408 square miles, or 2,181,120 acres.

The Penobscot River and its tributaries form the major drainage system of the county. Most streams flow into the Penobscot River or into lakes. The Aroostook River, in the extreme northwestern part, and the Sebasticook River, near Newport, flow out of the county. The Sebasticook is part of the drainage basin of the Kennebec River.

A survey by the Maine State Planning Board in 1935 showed that about 10 percent of the county was in lakes, ponds, bogs, or other wet areas. The ponds and lakes range in size from a few acres to several square miles. Most of them occur in the eastern and northern parts of the county.

A large part of the county is in forest. Extensive acreages of forest are owned by paper companies. Woodlots make up a large part of the farms, and some farmers get much of their income from the sale of forest products. Agriculture is a leading industry in the county. Dairy, poultry, and field-crop farms predominate. Hay, potatoes, oats, corn, and snap and dry beans are the principal crops. Numerous other industries are in the county, mainly in the Old Town, Bangor, and Brewer areas. Many of these process farm and woodland products.

How Soils Are Named, Mapped, and Classified

Soil scientists made this survey to learn what kinds of soils are in Penobscot County, where they are located, and how they can be used.

They went into the county knowing they likely would find many soils they had already seen, and perhaps some they had not. As they traveled over the county, they observed steepness, length, and shape of slopes; size and speed of streams; kinds of native plants or crops; kinds of rock; and many facts about the soils. They dug or bored many holes to expose soil profiles. A profile is the sequence of natural layers, or horizons, in a soil; it extends from the surface down to the rock material that has not been changed much by leaching or by roots of plants.

The soil scientists made comparisons among the profiles they studied, and they compared these profiles with those in counties nearby and in places more distant. They classified and named the soils according to uniform procedures. To use this report efficiently, it is necessary to know the kinds of groupings most used in a local soil classification.

Soils that have profiles almost alike make up a soil series. Except for different texture in the surface layer, all the soils of one series have major horizons that are similar in thickness, arrangement, and other important characteristics. Each soil series is named for a town or other geographic feature near the place where a soil of that series was first observed and mapped. Bangor and Suffield, for example, are the names of two soil series. All the soils in the United States having the same series name are essentially alike in natural characteristics.

Many soil series contain soils that are alike except for texture of their surface layer. According to this difference in texture, separations called soil types are made. Within a series, all the soils having a surface layer of the same texture belong to one soil type. Suffield silt loam and Suffield very fine sandy loam are two soil types in the Suffield series. The difference in texture of their surface layers is apparent from their names.

Some soil types vary so much in slope, degree of erosion, number and size of stones, or some other feature affecting their use, that practical suggestions about their management could not be made if they were shown on the soil map as one unit. Such soil types are divided into soil phases. The name of a soil phase indicates a feature that affects management. For example, Suffield silt loam, 2 to 8 percent slopes, is one of several phases of Suffield silt loam, a soil type that ranges from nearly level to steep.

After a fairly detailed guide for classifying and naming the soils had been worked out, the soil scientists drew soil boundaries on aerial photographs. They used photos for their base map because they show woodlands, buildings, field borders, trees, and similar detail that greatly help in drawing boundaries accurately. The soil map in the back of this report was prepared from the aerial photographs.

The areas shown on a soil map are called mapping units. On most maps detailed enough to be useful in planning management of farms and fields, a mapping unit is nearly equivalent to a soil type or a phase of a soil type. It is not exactly equivalent, because it is not practical to show on such a map all the small, scattered bits of soil of some other kind that have been seen within an area that is dominantly of a recognized soil type or soil phase.

In preparing some detailed maps, the soil scientist has a problem of delineating areas where different kinds of soils are so intricately mixed, and so small in size, that it is not practical to show them separately on the map. Therefore, he shows this mixture of soils as one mapping unit and calls it a soil complex. Ordinarily, a soil complex is named for the major soil series in it, for example, Stetson-Suffield complex.

The soil scientist may also show as one mapping unit two or more soils that do not occur in regular geographic associations. Such a mapping unit is called an undifferentiated soil group. An example in Penobscot County is Red Hook and Atherton fine sandy loams, 0 to 8 percent slopes.

Also, in most mapping, there are areas to be shown that are so rocky, so shallow, or so frequently worked by wind and water that they cannot be called soils. These areas are shown on a soil map like other mapping units, but they are given descriptive names, such as Rock outcrop, Mixed alluvial land, or Riverwash, and are called miscellaneous land types rather than soils.

After the soil scientist had named and described the soil series and mapping units and had shown the location of the mapping units on the soil map, there was more work to be done. The mass of detailed information he had recorded then needed to be presented in different ways for different groups of users, among them farmers, managers of woodlands and rangelands, and engineers.

To do this efficiently, he had to consult with persons in other fields of work and jointly prepare with them groupings that would be of practical value to different users. Such groupings are the capability classes, subclasses, and units, designed primarily for those interested in producing short-lived crops and tame pasture; woodland suitability groups, for those who need to manage wooded tracts; and the classifications used by engineers who build highways or structures to conserve soil and water.

General Soil Map

After study of the soils in a locality and the way they are arranged, it is possible to make a general map that shows the main patterns of soils. Such a map is the colored general soil map in the back of this report. The general soil areas are also called soil associations. Each kind of general soil area, or association, as a rule, contains a few major soils and several other minor soils, in a pattern that is characteristic although not strictly uniform.

The soils within any one association are likely to differ greatly among themselves in some properties; for example, slope, depth, stoniness, or natural drainage. Thus the general map does not show the kind of soil at any particular place, but several patterns of soils. Each pattern, furthermore, contains different soils.

The general soil areas are named for the major soil series in them, but as already noted, soils of other series may also be present. The major soil series of one general soil area may also be present in other areas, but in a different pattern.

The general map showing patterns of soils is useful to people who want a general idea of the soils, who want to compare different parts of a county, or who want to know the possible location of good-sized areas suitable for a certain kind of farming or other land use.

(BD) Bangor-Dixmont-Thorndike association: Stony and stone-cleared, deep to shallow slaty soils of the uplands

This soil association occupies broad, rolling and undulating ridges of glacial till. The ridges are about 300 to 600 feet in elevation (fig. 2). Interspersed with these ridges are (1) areas having moderately well drained, gentle slopes and (2) sharply contoured ridges that are shallow to bedrock and have numerous outcrops. The soils of this association are largely cleared of stone, but some are

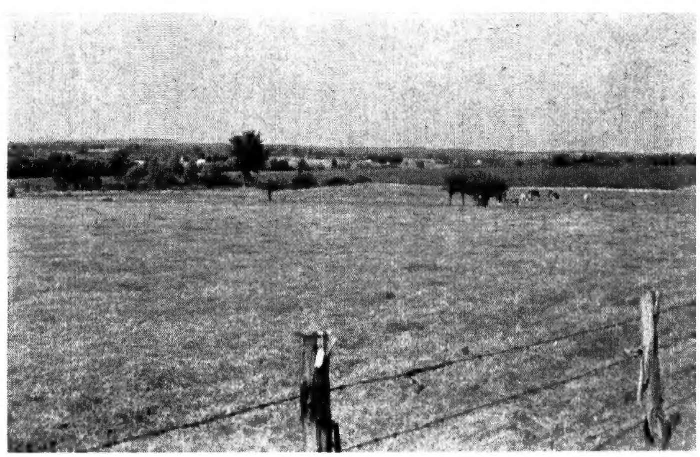

Figure 2.—Bangor-Dixmont-Thorndike association near Exeter, showing agricultural areas and subdued topography.

stony, especially the Monarda and Burnham soils. Streams are not well established and in many places are incipient. A large part of the towns of Dexter, Exeter, Corinna, and Newport are included in the association.

The soils are generally deep to bedrock. They have developed from slaty glacial till that is fine textured and very firm. Even the till that is shallow to bedrock is silty. Most of the silty glacial till in the county is in this association. The depth of the till to bedrock ranges from 5 to many feet; in many places the depth is 10 to 20 feet.

Predominant in this association are the well-drained Bangor, the well-drained Thorndike, the moderately well drained Dixmont, the poorly drained Monarda, and the very poorly drained Burnham silt loams. Approximately 30 percent consists of Bangor (and Perham) soils, 20 percent of Dixmont (and Daigle), 20 percent of shallow-to-bedrock Thorndike, 15 percent of Monarda, and 10 percent of Burnham soils. The remaining 5 percent consists of other soils and peat and muck swamps. The well-drained Perham soils and somewhat poorly drained Daigle soils occur in small areas around Patten and Stacyville. These soils are similar to the Bangor and Dixmont soils but are even more silty in the subsoil. They have more clay, however, and are more erodible than the Bangor and Dixmont soils.

This association is the leading agricultural section of Penobscot County. Most of it is cleared, but only a limited number of crops are grown. Potatoes, canning corn, beans, hay, and oats are the principal crops. Alfalfa is becoming established in this area, as well as a few orchards.

Most of the woodland consists of mixed hardwoods, white pine, and white-cedar. Sawtimber is grown. Most of this area is privately owned, and tree farms of spruce, fir, and white pine are common. White-cedar is cut extensively for pulpwood and poles. Much of the woodland can be cleared and cultivated, but there are a few scattered boulders of granite.

(BP) Bangor-Howland-Plaisted association: Stony and stone-cleared, deep, mainly slaty soils of the uplands; some have a compact layer

This soil association occupies generally rolling and undulating hills, ranging from 300 to nearly 600 feet in elevation. Small ponds, marshes, and flat interstream areas or stream headwaters lie among the hills and low ridges. Short, well-defined streams flow rapidly into these small ponds and marshes from the nearby rolling and undulating hills.

This association includes a large part of the towns of Lee, Springfield, Carroll, and Drew. It also includes smaller areas in the towns of Alton and Hudson and many places in the rolling uplands that lie next to the valley of the Penobscot River in the central part of the county.

The soils of this association are normally deep to bedrock. The predominant texture of the surface soil is silt loam and loam in most areas, but the texture is fine sandy loam or sandy loam in a few. The soils have formed from glacial till that ranges in texture from silt loam to gravelly sandy loam. Most of the glacial till, despite variation in coarseness, is firm and extremely hard in place when dry. When removed, much of the till is brittle and can be easily broken apart. Most of it is bouldery or stony, and some is gravelly, but these conditions do not interfere with soil use. The glacial till is many feet deep. The underlying bedrock observed in roadside pits is 10 to 30 feet below the surface. In many areas the depth to bedrock is greater; but in a few, it may be as little as 4 or 5 feet. Bedrock may outcrop anywhere in Penobscot County, and the area covered by this association is no exception. Small outcrops occur along stream courses and the sides or crests of the steeper hills.

The Bangor and Plaisted soils in this association are well drained, whereas the Howland soils range from moderately well drained to somewhat poorly drained. Monarda and Burnham soils occur in the poorly drained, low flats and marshy areas. Some organic mucks and peats occur around the lakes and marshes. They are largely undifferentiated and range from 2 to 20 feet or more in depth. Silt and clay materials usually occur in the bottom of the marshes.

Bangor soils make up approximately 35 percent of this soil association; Dixmont or Howland, 30 percent; and Plaisted, 20 percent. The rest of the association consists mainly of poorly drained soils but includes some shallow areas or areas of sandy and gravelly glacial outwash.

This soil association is second of the two leading agricultural sections in Penobscot County. Wooded areas are generally stony, but many fields, particularly those with Bangor soils, are cleared of stone. A considerable acreage is cultivated, pastured, or idle. The principal crops are potatoes, hay, grain, beans, corn, and canning crops. There are a few orchards. Both sawtimber and pulpwood are frequently cut in the forests. The principal trees are hard and soft maple, beech, and birch; some pine, white-cedar, hemlock, and spruce also grow. Spruce, fir, and white-cedar are abundant in the lowlands or in the poorly drained areas, but deciduous trees predominate elsewhere.

(HP) Hermon-Plaisted association: Stony and stone-cleared, deep, mainly granitic soils of the uplands

This soil association occurs with the Canaan-Thorndike-Hermon-Plaisted association in the mountainous sections and on rolling and steep hills in other sections of the county. It is moderately stony; the scattered stones and boulders are less than 3 feet in diameter. Most areas have no cliffs or extensive bedrock outcrops. The soils are generally deep; depth to bedrock ranges from 5 to many feet.

The very stony soils of the Hermon and Plaisted series are extensive in the central-northern and central-western parts of the county near Millinocket and in the towns of Indian Gore and Hopkins Academy. A small area of these very stony soils occur also in Clifton and Holden.

The very stony soils of the Plaisted and Hermon series are dominant in this association. They have formed, respectively, from very firm, mixed granitic and slaty glacial till and from somewhat loose granitic till. The soil areas as a whole are well drained to somewhat excessively drained but have good moisture-holding capacity. Rather large areas of moderately well drained to somewhat poorly drained Howland soils are mingled with the very stony soils of the Hermon and Plaisted series in the hilly section of the north-central area. In many places the low and marshy areas between the hills are Monarda and Burnham very stony silt loams.

Approximately 30 percent of this association consists of the very stony Hermon soils, 20 percent consists of the

Plaisted, 20 percent of the Dixmont, and 15 and 10 percent, respectively, of the very stony Monarda and Burnham soils. The rest is made up of various other soils, including those from gravelly and sandy glacial outwash.

Most of the acreage of very stony soils of the Hermon and Plaisted series is forested and supports good stands of mixed hardwoods and softwoods. In many places white pine is the dominant softwood. Other dominant trees are hard maple, white birch, poplar, fir, and hemlock. Hardwoods grow on many ridges in these areas, whereas white pine grows more frequently on the loose-textured, granitic till of the Hermon soils.

This association is ideal for timber production, as the rate of growth is rapid. At present, extensive areas are used for production of pulpwood and the trees never reach timber size.

The soils are generally too stony for agriculture. Many areas, however, could be cleared of trees and stones, especially those on the Plaisted and Howland soils (fig. 3). Crops well suited to cleared areas of these soils are described in the section "Capability Groups of Soils".

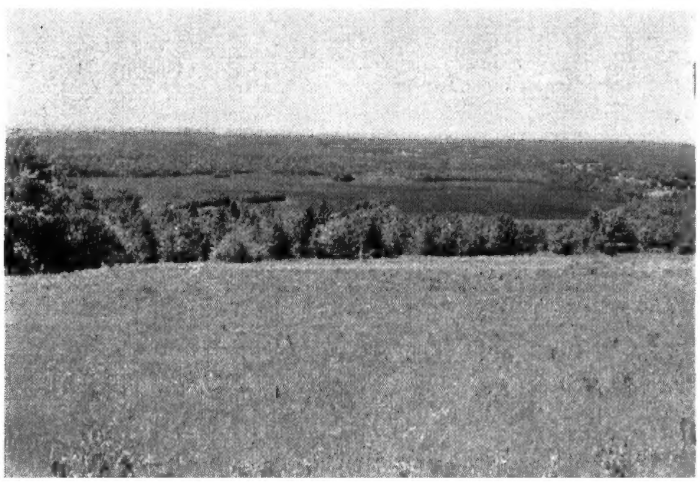

Figure 3.—**Westward vista across Davis Pond near East Eddington, showing subdued topography and glacial lake.**

Some very stony areas along streams and lakes in the towns of Millinocket and Lakeville include very cobbly and gravelly glacial outwash that is excessively drained. These areas support white and red pine and a few spruce and fir.

(MD) Monarda-Burnham-Dixmont association: Wet, dominantly very stony soils of the uplands

This association occupies large swampy basins and low areas of glacial till in the central parts of the county. It is also extensive in the town of Seboeis and in some of the unorganized towns north of it. Some areas are scattered over the southwestern part of the county. Most of the glacial till in the lowland is wet and stony to very stony, but there are a few low, gently sloping ridges of moderately well drained soils. The stones are thickly scattered but are rarely larger than 3 feet in diameter. Rock outcrops are fewer; they are confined to short, narrow, isolated ridges.

The poorly drained, very stony Monarda, the very poorly drained, very stony Burnham, and the moderately well drained Dixmont are the dominant soils in this association. The Burnham soils make up about 30 percent; the Monarda, 35 percent; and the Dixmont, 20 percent of the association. About 15 percent consists of other soils, such as the well-drained Bangor or Plaisted soils, peats and muck, and some areas of poorly drained Scantic and Biddeford soils, in clay basins. The stone-cleared areas of Dixmont soils in the association are usually where farms have been established on the better drained parts of the gently sloping ridges.

The soils of the Monarda-Burnham-Dixmont association are generally deep to bedrock and in most places are too wet or too stony for crops. With the exception of the stone-cleared Dixmont soils, most of this association is wooded. A small part of the wet soils has been cleared for pasture and hay, and some of the acreage of the Dixmont soils is cultivated for oats, corn, and hay. Most of this association is a spruce-fir flat. Spruce and fir are the dominant trees, but white-cedar, white pine, hemlock, and larch also grow well. The soils of this association are exceptionally well suited to pulpwood production because trees grow rapidly. The trees are shallow rooted, however, and those large enough for sawtimber blow over in high winds.

Some of the areas in this association are high enough to permit drainage. Drainage systems, therefore, would benefit nearly all the Monarda, Dixmont, and Howland soils that are to be cultivated or prepared for pasture.

(PM) Peat and muck association: Poorly drained organic soils

This soil association is widespread. It occurs in depressions and wide basins in all parts of the county where there are lakes and bogs. All of the soil is organic material from sedges, rushes, conifers, and heath. It is usually many feet deep and is ponded much of the year. Some dome-shaped sphagnum bogs, however, are saturated below ground level. Since these bogs are covered by heath bushes and sphagnum, the water is not evident.

The organic soils in this association are about 25 percent muck, 25 percent moderately fibrous peat, 30 percent unclassified peat and muck, and 5 percent sphagnum and coarsely fibrous peats. Other soils, chiefly those developed from sandy and gravelly glacial outwash and silty lacustrine and marine deposits, make up about 15 percent. Except for the areas of muck, none of this association is suitable for agriculture. White-cedar, spruce, and fir trees that are suitable for pulpwood usually grow well on the muck. The deep sphagnum peat bogs can be mined for litter. The other peats are generally open bogs without forest cover. Trees of sawtimber size usually blow over because of shallow rooting. Some peat and muck bogs in this general area are unclassified. These may be shallow and have only a foot or two of peat or muck over silt and clay deposits. They should be reexamined if detailed information is desired.

(PT) Plaisted-Thorndike-Howland association: Stony and ledgy, deep to shallow, granitic and slaty soils of the uplands

This association consists of wide, rolling hills of glacial till and narrow ridges of local bedrock on which a thin

mantle of till was deposited. Between the hills and ridges are narrow, level or gently sloping marshy areas. Depth to bedrock ranges from a few inches to many feet. Most of the areas that develop from glacial till are more than 5 feet deep. The soils in this association are mostly very stony. Granitic stones, mainly less than 3 feet in diameter, are scattered over the ground. Some of the soils are cleared of stones, which are piled in ricks or fences.

This association extends over the central and northern parts of the county.

The dominant soils are the well-drained Plaisted, developed from deep, mixed granitic and slaty glacial till; and Thorndike soils, developed from moderately deep and shallow glacial till over lime-seamed bedrock. These are medium-textured soils. Included soils are the moderately well drained Howland and the poorly and very poorly drained Monarda and Burnham. Nearly all wet areas are forested. Plaisted soils make up about 30 to 40 percent of the area; Thorndike, 20 percent; Howland, 15 to 30 percent; and Monarda and Burnham, 10 to 30 percent.

Cleared areas are generally used for potatoes, grain, and hay. A lot of land is now idle. Trees on forested areas are mostly hardwoods, spruce, and fir, but there is some white-cedar. The dominant trees on the hills are maple, birch, and beech, but spruce, fir, and white-cedar are common on the Monarda and Burnham soils. Sawtimber was harvested over most of the area. However, much of the forest land is owned by paper companies, and trees are cut mainly for pulpwood.

(RL) Canaan-Thorndike-Hermon-Plaisted association: Mountainous land

This soil association is on the highest mountains and hills (fig. 4) and on lowlands where bedrock is widely exposed. Many stones and huge boulders are scattered on the ground. In places there are nearly upright cliffs, a few to many feet high, that may form waterfalls. The soils are usually less than 3 feet deep to bedrock, and in many of the areas where bedrock is exposed, little or no soil material has formed. The generally rough landscapes are partly due to uneven weathering—the slow weathering of hard rocks, mostly granite, and the more rapid weathering of softer rocks, such as lime-seamed phyllite or shale.

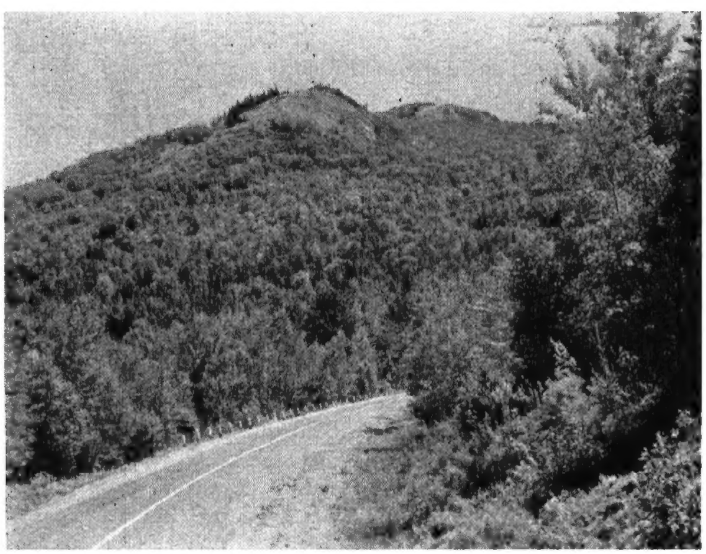

Figure 4.—**Rock outcrop on slopes that range from 5 to 45 percent or more. Peaked Mountain has an elevation of 1,160 feet and shows the lack of vegetation characteristic of this association.**

Approximately 40 percent of the acreage consists of Thorndike soils, and 30 percent of Canaan soils. These soils are shallow to bedrock and very stony. About 20 percent of the acreage consists of very stony soils of the Hermon, Plaisted, and Bangor series. These are deeper soils that occur around the margins of the Canaan and Thorndike soils. The Monarda and Burnham very stony soils occur in small marshy areas at stream headwaters and on benches along the mountainsides. They occupy about 10 percent of the total acreage.

The soils of this association are droughty except in a few wet areas. They hold little water for plants. Vegetation is sparse except on the deeper soils that make up a minor part of the acreage. Some sawtimber (especially white pine) is cut from areas of the deeper soils, and some pulpwood is cut from the more favorable parts of the shallow rocky areas. The rate of regrowth is very slow.

This area of waterfalls, tumbling brooks, cliffs, and mountains appears to be most useful as a recreation site. Some of the shale, or soft rock, in the southwestern part of the county is used in building roads. Granite, or hard rock, has been quarried for building material.

(SB) Suffield-Buxton-Biddeford association: Silty, well-drained to very poorly drained soils on rolling and depressional topography

This association consists of the undulating, rolling, and depressional parts of the wide lowlands in the southern part of the county. Most of the association is less than 250 feet above sea level and mainly along the principal streams and lakes. Extensive areas occur in the towns of Brewer, Orono, and Bangor, and scattered areas are in other towns bordering the Penobscot River and as far north as Mattawamkeag. At Mattawamkeag a mixed sand and clay complex marks the end of this association in the county, except for some areas near the northern lakes. All of the parent material is slowly to very slowly permeable, and internal drainage is generally poor.

The principal soils in this association are the well-drained Suffield (about 5 to 10 percent), the moderately well drained to somewhat poorly drained Buxton (about 30 percent), the poorly drained Scantic (about 25 percent), and the very poorly drained Biddeford (about 20 percent). Spots of well-drained, sandy and gravelly outwash also occur.

A large part of this association is cleared and is usually part of dairy farms. Since most of the area is more or less slowly permeable, drainage is the main problem. Drains and open ditches are both used. They should be spaced close together because the soils are fine textured.

Most of the poorly and very poorly drained areas of this association are wooded. They comprise the prominent spruce-fir flats from which most of the pulpwood is cut in the southern part of the county. In addition to the dense stands of spruce and fir, there is also white-cedar, larch, hemlock, some maple, and scattered white pine.

(SM) Stetson-Machias-Allagash-Hadley association: Gravelly and sandy soils of the terraces and flood plains

In this association the Stetson and Machias soils occupy characteristic long and very narrow, winding, glacial stream deposits known as eskers, or horsebacks. These eskers were formed in tunnels in the continental ice sheet as it melted during the last glacial recession. They are mostly in the principal drainage basins and are rarely very wide. Parts of them are many feet high, however, and the Enfield horseback, for example, runs nearly 60 miles across the county. Associated with the eskers are rolling and steep kames of sand and gravel from a similar source. Also associated are level, wet kettle holes or wide basins in which poorly drained silt, clay, and organic deposits occur. The principal eskers follow the Penobscot valley and tributary streams, but several run overland in the eastern and southwestern wings of the county.

Long, irregular, narrow areas of Adams and Allagash soils occur along the sides of the eskers in the valley of the Penobscot River. These soils are mostly on the nearly level, gently undulating, and steep-sided river terraces. Some, however, consist of gently rolling wind or water deposits of fine sand.

Flood plains follow the windings of the major streams across the county. Those along the Penobscot River are very narrow. The principal soils in these areas are the moderately well drained Podunk and Winooski, the well drained Ondawa and Hadley, and the poorly drained Limerick. Texture of the soils ranges from silt to coarse sand, and in a few places gravel and boulders have accumulated.

Most of this bottom land is subject to flooding, mainly in spring when the snow melts. Consequently, very little is cleared for crops. A considerable acreage, however, is cleared for pasture and hay, which are well suited. An equally large part is maintained in mixed hardwoods, including elm, basswood, birch, willow, soft maple, scattered white pine, and many alder thickets.

Most of the Stetson and Adams soils in this association are somewhat excessively drained. The medium-textured parts are well suited to canning and truck crops, berries, potatoes, and nurseries. They are also suitable for pastures, but the moderately well drained Machias soils are better suited. Most of the acreage of these soils is in white and red pine, spruce, and scattered oak and maple. This general area is excellent for production of pine, and sawtimber could be cut regularly from properly managed stands. At present, however, pulpwood is cut on most of this area.

Use and Management of Soils

In this section the land capability classification used by the Soil Conservation Service is briefly explained. The soils are placed in capability groups, and the management for each group is discussed. Erosion and erosion control and general use and management are also discussed, and estimated average acre yields are given for the soils under two levels of management.

Capability Groups of Soils

The capability classification is a grouping of soils that shows, in a general way, how suitable they are for most kinds of farming. It is a practical grouping based on limitations of the soils, the risk of damage when they are used, and the way they respond to treatment.

In this system all the kinds of soil are grouped at three levels, the capability class, subclass, and unit. The eight capability classes in the broadest grouping are designated by Roman numerals I through VIII. In class I are the soils that have few limitations, the widest range of use, and the least risk of damage when they are used. The soils in the other classes have progressively greater natural limitations. In class VIII are soils and landforms so rough, shallow, or otherwise limited that they do not produce worthwhile yields of crops, forage, or wood products.

The subclasses indicate major kinds of limitations within the classes. Within most of the classes there can be up to four subclasses. The subclass is indicated by adding a small letter, *e*, *w*, *s*, or *c*, to the class numeral, for example, IIe. The letter *e* shows that the main limitation is risk of erosion unless close-growing plant cover is maintained; *w* means that water in or on the soil will interfere with plant growth or cultivation (in some soils the wetness can be partly corrected by artificial drainage); *s* shows that the soil is limited mainly because it is shallow, droughty, or stony, and *c*, used in only some parts of the country, indicates that the chief limitation is climate that is too cold or too dry.

In class I there are no subclasses, because the soils of this class have few or no limitations. Class V can contain, at the most, only subclasses *w*, *s*, and *c*, because the soils in it have little or no susceptibility to erosion but have other limitations that restrict their use largely to pasture, range, woodland, or wildlife.

Within the subclasses are the capability units—groups of soils enough alike to be suited to the same crops and pasture plants, to require similar management, and to have similar productivity and other responses to management. Thus, the capability unit is a convenient grouping for making many statements about management of soils. Capability units are generally identified by numbers assigned locally, for example, IIe-1 or IIIe-5.

Soils are classified in capability classes, subclasses, and units in accordance with the degree and kind of their permanent limitations; but without consideration of major and generally expensive land-forming that would change the slope, depth, or other characteristics of the soil; and without consideration of possible but unlikely major reclamation projects.

The eight classes in the capability system, and the subclasses and units in this county, are described in the list that follows.

Class I.—Soils that have few limitations that restrict their use.

- Capability unit I-3.—Deep, well-drained soils on glacial till.
- Capability unit I-5.—Deep, well-drained soils on glacial outwash.
- Capability unit I-6.—Deep, well-drained soils of the flood plains.

Class II.—Soils that have some limitations that reduce the choice of plants or require moderate conservation practices.

Subclass IIe.—Soils subject to moderate erosion if they are not protected.

Capability unit IIe-1.—Moderately deep, undulating soils on glacial till.

Capability unit IIe-3.—Deep and moderately deep, gently sloping silty and loamy soils on glacial till.

Capability unit IIe-5.—Deep, gently sloping sandy soils.

Capability unit IIe-7.—Nearly level or gently sloping silty soils on lacustrine or marine deposits.

Subclass IIw.—Soils that have moderate limitations because of excess water.

Capability unit IIw-4.—Moderately well drained silty and loamy soils on glacial till.

Capability unit IIw-5.—Moderately well drained to somewhat poorly drained sandy soils on glacial outwash.

Capability unit IIw-6.—Moderately well drained soils of the flood plains.

Capability unit IIw-7.—Nearly level to gently sloping silty soils on lacustrine or marine deposits.

Capability unit IIw-8.—Sandy soils underlain by silt and clay.

Subclass IIs.—Soils that have moderate limitations of moisture capacity or tilth.

Capability unit IIs-5.—Nearly level to gently sloping, or undulating, somewhat droughty sandy soils on outwash terraces or on glacial till.

Class III.—Soils that have severe limitations that reduce the choice of plants, or require special conservation practices, or both.

Subclass IIIe.—Soils subject to severe erosion if they are cultivated and not protected.

Capability unit IIIe-1.—Moderately deep, sloping or rolling soils on glacial till.

Capability unit IIIe-3.—Deep and moderately deep, sloping silty soils on glacial till.

Capability unit IIIe-5.—Deep, sloping sandy soils.

Capability unit IIIe-7.—Deep, sloping silty soils on lacustrine or marine deposits.

Subclass IIIew.—Soils that are severely limited by risk of erosion and by excess water.

Capability unit IIIew-4.—Deep, sloping, moderately well drained soils on glacial till.

Capability unit IIIew-7.—Deep, sloping, moderately well drained soils on lacustrine or marine deposits.

Subclass IIIes.—Soils that are severely limited by risk of erosion and low moisture capacity.

Capability unit IIIes-5.—Deep, sloping or rolling, somewhat droughty sandy soils on outwash terraces or on glacial till.

Subclass IIIw.—Soils that have severe limitations because of excess water.

Capability unit IIIw-3.—Wet, nearly level and gently sloping silty soils on glacial till.

Capability unit IIIw-5.—Wet soils on the terraces.

Subclass IIIs.—Soils that have severe limitations of moisture capacity or tilth.

Capability unit IIIs-5.—Nearly level to undulating, deep, droughty sands and coarse gravelly sands of terraces.

Class IV.—Soils that have very severe limitations that restrict the choice of plants, require very careful management, or both.

Subclass IVe.—Soils subject to very severe erosion if they are cultivated and not protected.

Capability unit IVe-1.—Moderately deep, moderately steep or hilly soils on glacial till.

Capability unit IVe-3.—Deep and moderately deep, moderately steep silty soils on glacial till.

Capability unit IVe-5.—Deep, moderately steep sandy soils.

Capability unit IVe-7.—Deep, moderately steep silty soils on lacustrine and marine deposits.

Subclass IVes.—Soils that have very severe hazards because of erosion, stones, and low capacity for available moisture.

Capability unit IVes-4.—Deep, nearly level to moderately sloping stony soils on glacial till.

Capability unit IVes-5.—Deep, moderately steep, somewhat droughty sandy soils on outwash terraces or on glacial till.

Subclass IVw.—Soils that have severe limitations for cultivation because of excess water.

Capability unit IVw-7.—Wet, nearly level to gently sloping silty soils on lacustrine and marine deposits.

Subclass IVs.—Soils that have very severe limitations of stoniness, low moisture capacity, or other soil features.

Capability unit IVs-5.—Rolling, deep, very droughty loamy sands and coarse cobbly sandy loam on terraces.

Class V.—Soils not likely to erode that have other limitations, impractical to remove without major reclamation, that limit their use largely to pasture or range, woodland, or wildlife food and cover.

Subclass Vw.—Soils too wet for cultivation; drainage or protection not feasible.

Capability unit Vw-3.—Very wet silty soils on glacial till.

Subclass Vs.—Soils generally unsuitable for cultivation because of moisture capacity or tilth.

Capability unit Vs-3.—Very stony, nearly level, glacial-till soils that are deep and moderately well drained.

Class VI.—Soils that have severe limitations that make them generally unsuitable for cultivation and that limit their use largely to pasture or range, woodland, or wildlife food and cover.

Subclass VIe.—Soils severely limited, chiefly by risk of erosion if protective cover is not maintained.

Capability unit VIe-1.—Moderately deep to shallow, steep silty soils on glacial till.

Capability unit VIe-3.—Deep, steep loamy soils on glacial till.

Capability unit VIe-5.—Deep, steeply sloping sandy soils with some silty material.

Capability unit VIe-7.—Deep, moderately sloping to steep, eroded silty soils on lacustrine or marine deposits.

Subclass VIw.—Soils severely limited by excess water and generally unsuitable for cultivation.

Capability unit VIw-6.—Deep, nearly level, wet soils on flood plains subject to very frequent flooding.

Capability unit VIw-7.—Nearly level to gently sloping, very wet, silty soils on lacustrine and marine deposits.

Subclass VIs.—Soils generally unsuitable for cultivation and limited for other uses by their moisture capacity, stones, or other features.

Capability unit VIs-1.—Shallow, undulating to steep very stony and very rocky soils on glacial till.

Capability unit VIs-3. Deep, gently sloping to moderately steep, well drained or moderately well drained very stony soils on glacial till.

Class VII.—Soils that have very severe limitations that make them unsuitable for cultivation without major reclamation, and that restrict their use largely to grazing, woodland, or wildlife.

Subclass VIIes.—Soils very severely limited by risk of erosion and by low moisture capacity.

Capability unit VIIes-5.—Steep, very deep, somewhat droughty soils on glacial outwash and glacial till.

Subclass VIIw.—Soils very severely limited by excess water.

Capability unit VIIw-6.—Deep, nearly level, very wet soils of the flood plains subject to very frequent flooding.

Capability unit VIIw-9.—Very poorly drained organic deposits of peat and muck.

Subclass VIIs.—Soils very severely limited by moisture capacity, stones, or other soil features.

Capability unit VIIs-1.—Very shallow, sloping to steep, extremely rocky soils with very numerous rock outcrops.

Capability unit VIIs-3.—Deep, steep, very stony soils and strongly sloping to steep, extremely stony soils.

Capability unit VIIs-5.—Strongly sloping to steep, very droughty loamy sands and coarse cobbly sands of terraces.

Subclass VIIsw.—Soils extremely limited by a stony and rocky surface and by excess water.

Capability unit VIIsw-3.—Nearly level to sloping, stony and rocky, poorly drained and very poorly drained soils.

Class VIII.—Soils and landforms that have limitations that preclude their use, without major reclamation, for commercial production of plants, and that restrict their use to recreation, wildlife, water supply, or esthetic purposes.

Subclass VIIIw.—Extremely wet or marshy land.

Capability unit VIIIw-6.—Sand and gravel bars that occur along streams and are subject to very frequent flooding.

Capability unit VIIIw-9.—Very poorly drained deposits of peat and muck.

Subclass VIIIs.—Rocks or soil materials that have little potential for production of vegetation.

Capability unit VIIIs-1.—Mountainous and rough areas of rock outcrop; very little soil.

Management by capability units

The soils of the county that can be used and managed in about the same way are placed in a capability unit. A discussion of each unit follows.

CAPABILITY UNIT I-3

This unit consists of a nearly level, deep, well-drained silt loam that formed on glacial till. This soil is moderately permeable, moderately productive, friable, and easy to work. The surface soil and subsoil are strongly acid; the substratum is neutral or calcareous. The soil in this unit is—

Bangor silt loam, 0 to 2 percent slopes.

This soil is among the best in the county for tilled crops. It produces good yields consistently and can be farmed intensively. Potatoes, alfalfa, corn, peas, beans, small grains, and hay can be grown successfully.

If this soil is used primarily for growing corn or other tilled crops, a cropping system that includes a grass-legume sod every few years will improve soil structure and return organic matter to the soil. If a cover crop is grown each year, and can be planted early enough to make a good start in fall, the sod crop will not be needed.

CAPABILITY UNIT I-5

This unit consists of nearly level, deep, well-drained sandy soils of the terraces and a sandy soil that is underlain by clay at a depth of about 3 feet. Permeability is moderately rapid. The soils have a moderate capacity for storing water that plants can use. They are very friable and moderately productive. These soils are strongly acid, except for Stetson fine sandy loam, 0 to 2 percent slopes, which may be calcareous in the substratum. The soils in this unit are—

Allagash fine sandy loam, 0 to 2 percent slopes.
Melrose fine sandy loam, 0 to 2 percent slopes.
Stetson fine sandy loam, 0 to 2 percent slopes.

These soils are especially well suited to early vegetables and other early, quick-growing crops. Potatoes, corn, peas, beans, small grains, and hay are grown. If the soils are used principally for growing tilled crops, a cropping system that includes a grass-legume sod every few years will improve soil structure and return organic matter to the soil. If a cover crop is grown each year, and can be planted early enough to make a good stand in fall, the sod crop will not be needed.

CAPABILITY UNIT I-6

This unit consists of nearly level, deep, well-drained silty and sandy loam soils of the flood plains. These soils have moderate to moderately rapid permeability and are moderately productive. They are subject only to occasional flooding and are seldom damaged by floods. They are moderately acid. The soils in this unit are—

Ondawa fine sandy loam.
Hadley silt loam.

Potatoes, peas, beans, corn, small grains, and hay can be successfully grown. The faster growing varieties of sweet corn should be planted. If the soils are used primarily for tilled crops, a cropping system that includes a grass-legume sod every few years will improve soil structure and return organic matter to the soil. A cover crop, if planted early enough to make a good start in fall, may have the same effect. A few areas of these soils occur at low elevations above streams. Such areas are more subject to late spring frosts and to flooding.

CAPABILITY UNIT IIe-1

This unit consists of a moderately deep, undulating, somewhat droughty silty soil formed on thin glacial till. This soil is friable, easy to work, and permeable to water. It is strongly acid in the surface soil and subsoil and neutral in the substratum. The soil in this unit is—

Thorndike shaly silt loam, 2 to 8 percent slopes.

This soil is suited to corn, beans, potatoes, and small grains. It is fairly well suited to some hay and pasture crops. A cropping sequence of a tilled crop, a tilled crop, small grain, and hay is suitable. Contour farming is needed to reduce erosion. On the longest slopes, however, stripcropping or diversion ditches are also required. Many fields of Thorndike soil are so irregular in slope that conservation practices are difficult to install in some places. Such fields usually require conservation practices specifically fitted to their needs instead of strips regularly spaced on the slopes.

CAPABILITY UNIT IIe-3

This unit consists of deep and moderately deep, gently sloping, well-drained silty and loamy soils formed on glacial till. These soils are moderately permeable and moderately productive. They are friable and easy to work. They are strongly acid in the surface soil and subsoil. The Bangor and Perham soils, however, are neutral to calcareous in the substratum. The soils are—

Bangor silt loam, 2 to 8 percent slopes.
Bangor silt loam, moderately deep, 2 to 8 percent slopes.
Perham silt loam, 0 to 8 percent slopes.
Plaisted gravelly loam, 2 to 8 percent slopes.

These soils are suited to corn, beans, peas, potatoes, small grain, hay, and pasture. Orchards do well, especially on the Bangor soils. In most areas of these gently sloping soils, contour farming is needed to reduce the hazard of erosion. On the longer slopes, however, stripcropping or diversion ditches are also required. A winter cover crop will make good use of residual plant nutrients. When plowed under in spring, the cover crop adds organic matter and plant nutrients to the soil.

CAPABILITY UNIT IIe-5

This unit consists of deep, gently sloping, well-drained sandy soils of the terraces and a sandy soil underlain by clay at a depth of about 3 feet. These soils have moderately rapid permeability, are very friable, and are moderately productive. Except for the Stetson fine sandy loam, which may be calcareous in the substratum, these soils are strongly acid. The soils in this unit are—

Allagash fine sandy loam, 2 to 8 percent slopes.
Melrose fine sandy loam, 2 to 8 percent slopes.
Stetson fine sandy loam, 2 to 8 percent slopes.

These soils are especially suited to early vegetables and other quick-growing, early crops. The Melrose soil may not dry out as rapidly in the spring as the others, but it retains moisture better during long, dry spells. Potatoes, corn, beans, peas, and other vegetables and small grain and hay are grown on these soils. A cropping sequence that consists of a tilled crop for 2 years, small grain for 1 year, and hay for 1 year is suitable. Contour farming is needed to reduce the risk of erosion. On the longer slopes, stripcropping or diversion ditches are also required. A winter crop will make good use of residual plant nutrients. If plowed under in spring, this crop adds organic matter and plant nutrients to the soil.

CAPABILITY UNIT IIe-7

This unit consists of deep, nearly level or gently sloping, well-drained silty soils and soils with a sandy surface soil. All the soils have developed on lacustrine and marine deposits of silt and clay. The level soils have no significant limitations, but they are included in this unit because they occur in small, scattered areas. The soils in this unit are moderately and slowly permeable in the surface soil and slowly permeable in the subsoil. They are highly retentive of moisture. The surface soil and subsoil are strongly acid; the substratum is neutral. The soils in this unit are—

Suffield silt loam, 0 to 2 percent slopes.
Suffield silt loam, 2 to 8 percent slopes.
Suffield very fine sandy loam, 0 to 2 percent slopes.
Suffield very fine sandy loam, 2 to 8 percent slopes.

These soils are suited to cultivated crops common to the area, but they are especially suited to hay and pasture. They are less suited to potatoes, early, quick-growing crops, and orchards than to other crops. Because these soils are subject to erosion, a suitable cropping system should include 1 year each of a tilled crop, a small grain, and hay. Contour stripcropping is needed if tilled crops are grown. Many of the long slopes will also need diversion ditches.

CAPABILITY UNIT IIw-4

This unit consists of nearly level to gently sloping silty and loamy soils that formed on glacial till. These soils are deep and moderately well drained. They have moderately slow permeability. Mottling in the lower subsoil indicates impaired drainage. All the soils are strongly acid in the surface soil and subsoil; the Dixmont and Daigle soils are neutral in the substratum. The soils in this unit are—

Daigle silt loam, 0 to 2 percent slopes.
Daigle silt loam, 2 to 8 percent slopes.
Dixmont silt loam, 0 to 2 percent slopes.
Dixmont silt loam, 2 to 8 percent slopes.
Howland gravelly loam, 0 to 8 percent slopes.

These soils are suited to corn, beans, peas, small grain, hay, and pasture. Because of their wetness, they are not particularly suitable for potatoes or orchards unless tile drains are installed. Some potatoes are grown on these soils when they are parts of fields that include drained soils.

Grassed waterways provide satisfactory drainage in areas used principally for hay or pasture. If tilled crops are grown, contour farming or stripcropping on a slight grade is needed. A winter cover crop will take up plant nutrients not used by the preceding tilled crops. Further-

more, when the cover crop is plowed under in spring, it will add organic matter and plant nutrients to the soil. These soils can be used in a rotation of potatoes, oats, and hay. The hay crop is often left for 2 years or more.

CAPABILITY UNIT IIw–5

This unit consists of deep, nearly level to undulating, moderately well drained to somewhat poorly drained sandy soils of the terraces. These soils have moderately rapid permeability, are friable, and are strongly to moderately acid. The soils in this unit are—

Machias fine sandy loam, 0 to 8 percent slopes.
Madawaska very fine sandy loam, 0 to 8 percent slopes.

Since these soils are generally sandy, they can be readily drained by tile. After drainage, they will grow vegetables, potatoes, corn, beans, small grain, and hay. They are not as suitable for early market crops as the better drained sandy soils, since they cannot be planted as early in spring. During prolonged dry periods, however, they will retain moisture better. Areas of the soils in this unit that have not been drained are used more often for pasture than for cultivated crops. A considerable area of these soils remains in woods.

Because of the slope gradient and short slopes, erosion is seldom a problem on these soils. Row crops can be grown 2 or more years in succession by using winter cover and planting on the contour. The cropping system should include a grass-legume mixture every few years to maintain soil structure.

CAPABILITY UNIT IIw–6

This unit consists of deep, nearly level, moderately well drained silty and sandy soils of the flood plains. These soils are subject to occasional flooding and are moderately permeable. Since they are partly depressional, they dry out more slowly than the well-drained soils of the flood plains. The soils in this unit are—

Podunk fine sandy loam.
Winooski silt loam.

These soils are well suited to hay and pasture in their natural condition; but unless drained, they are not so well suited to row crops. Drainage may be provided by tile or grassed waterways, the method depending upon the nature of the drainage outlet. If drained, these soils will produce all of the common crops of the area. They can be cropped intensively in locations that are seldom flooded. Fertilization and winter cover are necessary on heavily cropped land.

CAPABILITY UNIT IIw–7

This unit consists of deep, nearly level to gently sloping, moderately well drained silty soils that have formed on lacustrine and marine silt and clay. These soils have moderately slow permeability in the surface soil and slow permeability in the subsoil. The surface soil and subsoil are strongly acid, and the substratum is neutral. The soils in this unit are—

Buxton silt loam, 0 to 2 percent slopes.
Buxton silt loam, 2 to 8 percent slopes.

In their natural condition, these soils are especially well suited to hay and pasture. Corn, beans, and small grains can be grown where drainage is installed. The soils in this unit should be carefully managed, as they become cloddy if worked when too wet.

If tilled crops are grown, a cropping sequence that consists of corn or beans, oats, and hay is suitable. For erosion control, contour farming should be used on the more gentle slopes and stripcropping on the stronger slopes. Grassed waterways provide satisfactory drainage in many places. Tile drains have been successful on these soils, but the tile lines must be laid closer together than in soils with coarser texture. The more level areas of these soils may be more difficult to drain effectively because suitable outlets are not easily obtained.

CAPABILITY UNIT IIw–8

This unit consists of a deep, nearly level to gently sloping, moderately well drained soil with approximately 2 feet of sandy material over silt and clay deposits. This soil has moderately rapid permeability in the surface soil and moderately slow permeability in the subsoil. It is friable and easy to work. The soil in this unit is—

Elmwood fine sandy loam, 0 to 8 percent slopes.

In its natural condition, this soil is well suited to hay and pasture crops. If adequately drained, it may be used for cultivated crops. Grassed waterways and tiles will drain this soil effectively for tilled crops. Row crops should be planted on the contour and used in a rotation that provides a vegetative cover 50 percent, or more, of the time.

CAPABILITY UNIT IIs–5

This unit consists of deep, nearly level to gently sloping or undulating, somewhat excessively drained, gravelly and sandy soils. These soils are very friable, rapidly permeable, and strongly acid. The soils in this unit are—

Colton gravelly sandy loam, dark materials, 0 to 2 percent slopes.
Colton gravelly sandy loam, dark materials, 2 to 8 percent slopes.
Hermon sandy loam, 2 to 8 percent slopes.
Hermon sandy loam, moderately deep, 2 to 8 percent slopes.

These soils are fairly well suited to early, quick-maturing crops. Their use for long-season crops is somewhat limited unless supplemental irrigation is provided. Contour farming is needed on the slopes that are steeper than 2 percent. The longer slopes require stripcropping and diversion ditches as well. These soils are normally not erodible, but all freeze deeply during winter. In spring when the soils begin to thaw, a frozen layer beneath the surface increases the risk of erosion on the more pronounced slopes. A winter cover crop helps prevent blowing on these sandy soils and helps maintain organic matter.

CAPABILITY UNIT IIIe–1

This unit consists of a moderately deep, sloping or rolling, somewhat droughty, silty soil that formed on thin glacial till. This soil is permeable to water, friable, and easy to work. It is strongly acid in the surface soil and subsoil and is neutral in the substratum in areas where the bedrock is limy. The soil in this unit is—

Thorndike shaly silt loam, 8 to 15 percent slopes.

This soil is suited to the same crops as the soil in capability unit IIe–1 and is used in much the same way. Slopes are stronger, however. A suitable cropping system

is 1 year of a tilled crop, 1 year of a small grain, and 1 year of hay—for example, potatoes, oats, and clover. Stripcropping is needed. Diversion ditches are also needed on the longer slopes that are not too irregular and sharp. Many fields of this soil, however, do have sharp and irregular slopes and rock outcrops. The only practical conservation practices for such areas are long rotations, winter cover crops, and stripcropping in a few places. Some grasses and cover crops burn out near the outcrops or where the soil is very thin. Topdressings of manure and compost will help maintain the grasses and crops on such areas.

CAPABILITY UNIT IIIe-3

This unit consists of deep and moderately deep, sloping, well-drained, silty or loamy soils formed in glacial till. These soils are moderately permeable, friable, and easy to work. They are moderately productive. They are strongly acid in the surface soil and subsoil. The Bangor and Perham soils, however, are neutral to calcareous in the substratum. The soils in this unit are—

Bangor silt loam, 8 to 15 percent slopes.
Bangor silt loam, moderately deep, 8 to 15 percent slopes.
Perham silt loam, 8 to 15 percent slopes.
Plaisted gravelly loam, 8 to 15 percent slopes.

These soils are suited to corn, beans, peas, potatoes, small grain, hay, and pasture. A suitable cropping system is 1 year of a tilled crop, 1 year of a small grain, and 1 year of hay—for example, potatoes, oats, and clover. Stripcropping and diversion ditches are needed on the longer slopes. These sloping soils have a little better air drainage and are not as subject to frost damage as their more level counterparts. Consequently, they are better suited to orchards and small fruit.

CAPABILITY UNIT IIIe-5

This unit consists of deep, sloping, well-drained sandy soils of the terraces and a sandy soil underlain by clay at about 3 feet. These soils have moderately rapid permeability, are very friable, and are moderately productive. They are strongly acid, but the Stetson soil is calcareous in the substratum in places. This unit also includes a soil complex that consists of areas of Stetson and Suffield soils that are too intermingled to be separated on the map at the scale used. The soils in this unit are—

Allagash fine sandy loam, 8 to 15 percent slopes.
Melrose fine sandy loam, 8 to 15 percent slopes.
Stetson fine sandy loam, 8 to 15 percent slopes.
Stetson-Suffield complex, 0 to 15 percent slopes.

These soils are suited to early vegetables and other quick-growing, early crops. The most intensive cropping system that would be suitable for these soils is 1 year of a tilled crop, 1 year of small grain, and 1 year of hay—for example, sweet corn, oats, and clover. Stripcropping and diversion ditches are needed on the longer slopes.

CAPABILITY UNIT IIIe-7

This unit consists of deep, sloping, well-drained soils. These soils have developed on lacustrine and marine silts and clays. One has a silty and the other a sandy surface soil. Generally, the soils are finer textured with increase in depth. They have moderately slow permeability in the surface soil and slow permeability in the subsoil. The surface soil and subsoil are strongly acid; the substratum is neutral. These soils are highly retentive of moisture. The soils in this unit are—

Suffield very fine sandy loam, 8 to 15 percent slopes.
Suffield silt loam, 8 to 15 percent slopes.

These soils are suited to the cultivated crops common to the area. They are especially well suited to hay and pasture crops, particularly alfalfa. They are less suitable for potatoes, early, quick-growing crops, and orchard fruits. Because they are subject to erosion, the cropping system should include a tilled crop no oftener than 1 year in 3 or 4. Contour stripcropping—the strips not more than 300 feet wide—is needed. Many of the long slopes will also need diversion ditches unless a grass cover is maintained.

CAPABILITY UNIT IIIew-4

This unit consists of sloping silty and loamy soils that formed on glacial till. These soils are deep and moderately well drained. They have moderately slow permeability. They are mottled in the lower subsoil—an indication of impaired drainage. All the soils are strongly acid in the upper part. In places the Dixmont and Daigle soils are neutral or weakly calcareous in the substratum. Because of limited acreage, some areas that range from 15 to 25 percent in slope are included in this unit. The soils in this unit are—

Daigle silt loam, 8 to 15 percent slopes.
Dixmont silt loam, 8 to 15 percent slopes.
Howland gravelly loam, 8 to 15 percent slopes.

These soils are suited to the same crops as the soils in capability unit IIw-4. Because of the combination of wetness and stronger slopes, however, these soils should have a cropping system that includes more years of hay or pasture. A cropping sequence that includes oats and hay at least 3 years out of 4 is suitable. Stripcropping is necessary if a tilled crop is grown.

These moderately well drained soils occur in many places on rather long, sloping hillsides. If these soils are cultivated without runoff control, heads of water build up in the soil and create a serious erosion hazard. Diversion ditches may be necessary to control runoff and reduce the erosion hazard on the longer slopes. The soils in this unit have fairly uniform slopes, and contour farming would therefore be practical.

CAPABILITY UNIT IIIew-7

This unit consists of a deep, sloping, moderately well drained silty soil that developed on lacustrine and marine silt and clay. This soil has moderately slow permeability in the surface soil and slow permeability in the subsoil. The surface soil and subsoil are strongly acid; the substratum is neutral. The soil in this unit is—

Buxton silt loam, 8 to 15 percent slopes.

This soil is susceptible to erosion and has impaired drainage; use for tilled crops is severely limited. Corn, beans, hay, and pasture can be grown where adequate drainage is provided and erosion control practices are used. Such practices include graded strips and diversion terraces. Many undrained areas of this soil are used for hay and pasture. Row crops can be grown at about 4-year intervals. They should be followed by grass.

CAPABILITY UNIT IIes-5

This unit consists of deep, sloping or rolling, somewhat droughty gravelly and sandy soils. These soils are very friable, rapidly permeable, and strongly acid. The soils in this unit are—

Colton gravelly sandy loam, dark materials, 8 to 15 percent slopes.
Hermon sandy loam, 8 to 15 percent slopes.
Hermon sandy loam, moderately deep, 8 to 15 percent slopes.

These soils dry out more rapidly than those in capability unit IIs-5, and their need for supplemental irrigation is greater. They are best suited to quick-maturing crops grown for early market. If these soils are used for tilled crops, contour strips are needed. Areas on the longer slopes also need diversion ditches. Cover crops are a desirable source of needed organic matter. Because of their medium to coarse texture, these soils are not well suited to some grasses and legumes. Suitable grains and drought-tolerant grasses make the best cover crops.

CAPABILITY UNIT IIIw-3

This unit consists of a deep, level to gently sloping, poorly drained silty soil that formed on glacial till. The upper layers are slowly permeable and acid. The substratum is slightly acid to neutral. The soil in this unit is—

Monarda silt loam, 0 to 8 percent slopes.

In its natural condition, this soil is suited mainly to hay and pasture crops. After drainage, it may be used for the tilled crops that do not need to be planted too early in spring. Oats may be grown, but yields will be highest where the drainage is adequate. This soil may be tile drained, especially where it occurs as rather narrow draws in a field of better drained soils. Grassed waterways will improve drainage and keep most of the water from spreading over the field. The cropping system may include an occasional row crop, followed by grain and several years of hay. Much of this soil is in woods.

CAPABILITY UNIT IIIw-5

This capability unit consists of deep, level to gently sloping, poorly drained and very poorly drained soils. These soils developed on terraces. They are slowly permeable and slightly acid. The soils in this unit are—

Red Hook and Atherton fine sandy loams, 0 to 8 percent slopes.
Red Hook and Atherton silt loams, 0 to 8 percent slopes.

These soils, without adequate drainage, are primarily suited to moisture-tolerant grasses and legumes. After adequate drainage, they may be used for tilled crops. Planting dates, even after drainage, will be appreciably delayed in spring. Tile drains, ditches, and grassed waterways will improve the drainage. Most areas of these soils are in woods. Fir and spruce are the principal trees. Definite rotations are seldom feasible on these soils. Row crops are limited to years with an early spring and are followed by grass.

CAPABILITY UNIT IIIs-5

This unit consists of deep and very deep, nearly level to undulating, excessively drained loamy sands and coarse gravelly sands of the terraces. These soils are very rapidly permeable and very strongly acid. The soils in this unit are—

Adams loamy sand, 0 to 8 percent slopes.
Colton cobbly sandy loam, dark materials, 0 to 8 percent slopes.
Colton loamy fine sand, dark materials, 0 to 2 percent slopes.
Colton loamy fine sand, dark materials, 2 to 8 percent slopes.

If these very droughty soils are not irrigated, even short-season, early planted crops will be impeded by lack of moisture before maturity. Blowing may occur in areas left bare any length of time. Areas used for cropland should receive liberal amounts of manure and fertilizer. Also, deep-rooted grasses and legumes should be planted following the tilled crops and reseeding should be frequent. If irrigated, the soils in this unit are suitable for forest nurseries.

CAPABILITY UNIT IVe-1

This unit consists of a moderately deep, moderately steep or hilly silty soil that formed on thin glacial till. This soil is somewhat droughty. It is permeable to water, friable, and easy to work. It is strongly acid in the surface soil and subsoil and neutral in the substratum. The soil in this unit is—

Thorndike shaly silt loam, 15 to 25 percent slopes.

This soil is suited to the same crops as the soils in capability units IIe-1 and IIIe-1. The slopes are quite strong, irregular, and sharp, and the erosion hazard on this relatively shallow soil is high. A tilled crop should not be grown more often than 1 year in 4 or 5; hay should be grown the other years. Long rotations or cover crops are about the only practical measures for control of runoff on this soil. Only a few areas have slopes that are smooth enough for contour planting, stripcropping, or diversion ditches.

CAPABILITY UNIT IVe-3

This unit consists of deep and moderately deep, well-drained silty or loamy soils formed on glacial till. These soils are mainly moderately steep, but in places they are hilly. They are moderately permeable. The soils are friable, easy to work, and moderately productive. They are strongly acid in the surface soil and subsoil. The Bangor soils, however, are neutral to calcareous in the substratum. The soils in this unit are—

Bangor silt loam, 15 to 25 percent slopes.
Bangor silt loam, moderately deep, 15 to 35 percent slopes.
Plaisted gravelly loam, 15 to 25 percent slopes.

These soils are suited to beans, peas, potatoes, small grain, hay, and pasture. Their use for tilled crops, however, is restricted because of their strong slopes. A cropping sequence of 1 year of a tilled crop, 1 year of small grain, and 4 or 5 years of hay is suitable. Stripcropping is needed on these soils to reduce the hazard of erosion. Diversion ditches are also needed on the longer slopes.

CAPABILITY UNIT IVe-5

This unit consists of deep, moderately steep, well-drained sandy soils of the terraces. These soils have moderately rapid permeability, are very friable, and are moderately productive. They are strongly acid, but the substratum of the Stetson soil is neutral or calcareous in places. The soils in this unit are—

Allagash fine sandy loam, 15 to 25 percent slopes.
Stetson fine sandy loam, 15 to 25 percent slopes.

These soils are suited to vegetables and other quick-growing early crops. Their use for tilled crops, however,

is limited because of the strong slopes. A cropping sequence of 1 year of a tilled crop, 1 year of small grain, and 4 or 5 years of hay is suitable. Stripcropping and diversion ditches should be used on the longer slopes to reduce the erosion hazard.

CAPABILITY UNIT IVe-7

This unit consists of deep, moderately steep, well-drained silty and sandy soils, some of which have been eroded. These soils developed on lacustrine and marine silt and clay and are generally finer textured as the depth increases. The soils have moderately slow permeability in the surface soil and slow permeability in the subsoil. The surface soil and subsoil are strongly acid; the substratum is neutral. The soils are highly retentive of moisture. They have rapid runoff. The soils in this unit are—

Suffield silt loam, 8 to 15 percent slopes, eroded.
Suffield silt loam, 15 to 25 percent slopes.
Suffield very fine sandy loam, 15 to 25 percent slopes.

These soils are suited to grass and pasture. They have fine texture and strong slopes and are easily eroded when tilled. If a tilled crop is grown, it should be planted in contour strips about 75 feet wide and only once in 5 years. Diversion ditches are needed on many long erodible slopes.

CAPABILITY UNIT IVes-4

The soils in this unit are deep, stony, and nearly level to moderately sloping. They range from well drained to somewhat poorly drained. These soils have a moderate water-holding capacity and are productive. The soils in this unit are—

Daigle stony silt loam, 0 to 2 percent slopes.
Daigle stony silt loam, 2 to 8 percent slopes.
Daigle stony silt loam, 8 to 15 percent slopes.
Perham stony silt loam, 0 to 8 percent slopes.
Perham stony silt loam, 8 to 15 percent slopes.

These soils are suited to oats, potatoes, hay, and pasture. Surface stoniness is their major limitation. Although the stoniess does not prevent cultivation, it seriously interferes with mechanized equipment. Most areas are used for hay or pasture and an occasional row crop. If these soils are cleared of surface stones, they can be used in a rotation of potatoes, oats, and 2 or more years of hay.

CAPABILITY UNIT IVes-5

This unit consists of a deep, moderately steep gravelly and sandy soil. This soil is very friable, rapidly permeable, and strongly acid. The soil in this unit is—

Colton gravelly sandy loam, dark materials, 15 to 25 percent slopes.

Supplemental irrigation will increase the yields of tilled crops on this hilly and somewhat droughty soil. Unless this soil is irrigated, it is better to keep it most of the time in grasses that will withstand drought. Only an occasional row crop should be grown. Another good use is for woods. Plantings of white pine do well on this soil.

CAPABILITY UNIT IVw-7

This unit consists of a level to gently sloping, deep, poorly drained, silty soil that has developed on lacustrine and marine silt and clay. The surface soil and subsoil are very slowly permeable. Also, they are both strongly acid, but the substratum is neutral. The soil in this unit is—

Scantic silt loam, 0 to 8 percent slopes.

This soil is suited primarily to hay and pasture. An occasional row crop can be grown. The soil is usually wet for many days in spring and fall. It cannot be drained easily by tile because of its fine texture. Open drains, however, are used in places. These drains are usually sodded when built and are kept in grass. If worked when wet, this soil has a tendency to clod, even after drainage, and is therefore not suited to regular cultivation. Some small fruits may be grown. Much of this soil is now in woods. Spruce and fir are the dominant trees.

CAPABILITY UNIT IVs-5

This unit consists of rolling, deep and very deep, droughty loamy sands and coarse cobbly sandy loam. These soils are very rapidly permeable and very strongly acid. The soils in this unit are—

Adams loamy sand, 8 to 15 percent slopes.
Colton cobbly sandy loam, dark materials, 8 to 15 percent slopes.
Colton loamy fine sand, dark materials, 8 to 15 percent slopes.

Without irrigation, all of these soils are too droughty and sloping for regular cultivation and for most grasses. Drought-resistant grasses should be planted and cultivation should be limited to 1 year in 5 or 6. These soils are mainly in pine woods that include mixtures of red spruce and aspen. They are well suited to forest. They are excellent for roadbuilding and airport construction where gravelly and cobbly materials are needed. Some areas that are less coarse textured are used for tree nurseries and garden crops. Such areas are irrigated and heavily fertilized.

CAPABILITY UNIT Vw-3

This unit consists of a deep, nearly level to gently sloping, very poorly drained silty soil that formed on glacial till. This soil is slowly permeable. It is acid in the surface layer but neutral or slightly acid in the lower substratum. The soil in this unit is—

Burnham silt loam, 0 to 3 percent slopes.

This soil is mostly in woods that include cedar, spruce, and fir trees. If drained to some extent, it may be used for pasture. Moisture-tolerant grasses and legumes should be seeded in these areas. Grazing should be so managed that the pasture has enough time to recover after use.

CAPABILITY UNIT Vs-3

This unit consists of a very stony soil on glacial till. It is nearly level, deep, and moderately well drained. The soil in this unit is—

Dixmont very stony silt loam, 0 to 2 percent slopes.

This very stony soil is suitable for improved pasture. In areas used for pasture, moisture-tolerant grasses and legumes should be encouraged by topdressing.

Most areas of this soil are wooded and are used for woodland products. As these areas are slightly depressed, it is difficult to locate and maintain woods roads on them. Some of the less stony areas, if cleared of surface stone, could be managed like the soils in capability unit IIw-4.

CAPABILITY UNIT VIe-1

This unit consists of a steep, moderately deep to shallow, well-drained, shaly silty soil. It developed on thin glacial till. The soil in this unit is—

Thorndike shaly silt loam, 25 to 45 percent slopes.

If this steep and generally shallow soil is used for pasture, every effort should be made to maintain a good sod covering to prevent serious erosion. Topdressing will increase the growth of grass. This soil is of limited acreage, is not a productive grass soil, and can be managed better as woodland.

CAPABILITY UNIT VIe-3

This unit consists of a deep, steep, well-drained, loamy soil formed on glacial till. It is moderately permeable and moderately productive. It is strongly acid in the surface soil and subsoil. The soil in this unit is—

Plaisted gravelly loam, 25 to 45 percent slopes.

This soil is used mostly for pasture, woodland, and wildlife. Many of the old fields in which it occurs are idle or are in young forest growth.

CAPABILITY UNIT VIe-5

This unit consists of deep, steep, well-drained sandy soils. These soils formed from glacial outwash that has inclusions of silt and clay in places. They have moderately rapid permeability except where the silt and clay occur. In these places the soils may be only moderately permeable. The soils in this unit are moderately productive and, in general, very friable. They are strongly acid, though the Stetson soil may be neutral or calcareous in the substratum. The soils of this capability unit are mapped together as—

Stetson-Suffield complex, 15 to 45 percent slopes.

These steep soils are used mainly for woods. The trees are principally pine and associated species. Some areas are cleared and used for pasture or hay, especially where most of the field is in better soils. Gravel and sand pits are also common in these soils. They are used as a source of sand and gravel.

CAPABILITY UNIT VIe-7

This unit consists of moderately sloping to steep, well-drained, slowly permeable silty soils, some of which have been eroded. These soils formed from marine and lacustrine silts and clays and are generally finer textured as the depth increases. The surface soil and subsoil are strongly acid; the substratum is neutral or slightly calcareous in the lowest part. The soils are highly retentive of moisture and also have rapid runoff. The soils in this unit are—

Suffield silt loam, 15 to 25 percent slopes, eroded.
Suffield silt loam, 25 to 45 percent slopes.

This highly erodible soil should be used only for pasture, woodland, and wildlife. Grass cover should be maintained at all times, and grazing should be restricted during periods of wet weather. Special practices may be needed to stop the spread of gullies.

CAPABILITY UNIT VIw-6

This capability unit consists of poorly drained and very poorly drained deposits on bottom lands. These areas are subject to very frequent flooding. The relief is nearly level. Areas of Mixed alluvial land are variable; some are sandy, some consist of silt or clay, and some include rocks and boulders that have washed down the streams. This unit comprises—

Limerick silt loam.
Mixed alluvial land.

These mapping units are suitable for pasture, but they are mainly forested. They are generally in narrow bands adjacent to streams. Areas used for pasture should be seeded to moisture-tolerant grasses and legumes. Grazing should be regulated to maintain a good sod. Trees do not grow rapidly on these mapping units.

CAPABILITY UNIT VIw-7

This unit consists of a deep, nearly level to gently sloping, very poorly drained silty soil. This soil developed on lacustrine and marine silt and clay. It is very slowly permeable. The surface soil and subsoil are acid, but the substratum is neutral. The soil in this unit is—

Biddeford silt loam, 0 to 3 percent slopes.

This soil is mainly in woods. In spite of poor drainage, however, some of it has been cleared and is used for pasture. Drainage is difficult to install and maintain in this silty soil. Pastured areas, however, may be improved by open ditches or grassed waterways. This partial drainage would make it possible to develop improved pasture by growing reed canarygrass and other grasses suited to wet soils. Grazing should be restricted when this soil is wet enough to cause puddling.

CAPABILITY UNIT VIs-1

This unit consists of undulating to steep, very shallow and shallow, very stony and very rocky soils. These soils formed on thin glacial till. The soils in this unit are—

Thorndike very rocky silt loam, 2 to 8 percent slopes.
Thorndike very rocky silt loam, 8 to 15 percent slopes.
Thorndike very stony silt loam, 2 to 8 percent slopes.
Thorndike very stony silt loam, 8 to 15 percent slopes.
Thorndike very stony silt loam, 15 to 35 percent slopes.

Some areas of these soils can be used for pasture. They are usually droughty because of shallowness, and the grass will burn out during dry summers. Some of the deeper, less stony or rocky areas can be used more intensively for pasture. Most of the soils in this unit are in woods.

CAPABILITY UNIT VIs-3

This unit consists of deep, very stony, gently sloping to moderately steep, well-drained silty or loamy soils formed on glacial till. These soils are similar to the soils included in capability unit IIe-3, but all have stones on the surface, and some are steeper. Also included in this unit are deep, very stony, gently sloping to moderately steep, moderately well drained soils. These soils are similar to the soils included in capability unit IIw-4, but all have stones on the surface, and some are steeper. The soils in this unit are—

Bangor very stony silt loam, 0 to 8 percent slopes.
Bangor very stony silt loam, 8 to 15 percent slopes.
Bangor very stony silt loam, 15 to 25 percent slopes.
Dixmont very stony silt loam, 2 to 8 percent slopes.
Dixmont very stony silt loam, 8 to 15 percent slopes.
Hermon very stony sandy loam, 2 to 8 percent slopes.
Hermon very stony sandy loam, 8 to 15 percent slopes.
Howland very stony loam, 0 to 8 percent slopes.

Howland very stony loam, 8 to 15 percent slopes.
Howland very stony loam, 15 to 25 percent slopes.
Plaisted very stony loam, 5 to 15 percent slopes.

These soils are suitable for improved pasture. Grasses and legumes on areas used for pasture should be encouraged by topdressing.

These soils are used mainly for woods and for the production of woodland products. Roads for logging operations are mainly on the soils in this unit that have slopes of less than 15 percent. Some of the less stony areas, if cleared of surface stones, could be used and managed like similar soils in capability units IIe-3 and IIw-4.

CAPABILITY UNIT VIIes-5

This unit consists of a very deep, steep, somewhat excessively drained soil from glacial outwash and gravelly sandy glacial till. The soil in this unit is—

Colton gravelly sandy loam, dark materials, 25 to 45 percent slopes.

This soil occurs mostly as eskers and kames with steep side banks or slopes and relatively narrow, winding, undulating or gently sloping tops. In most places the steep banks are wooded, but in a few places they are cleared and support a sparse grass cover. Numerous gravel pits are dug in the Colton soils for building materials.

CAPABILITY UNIT VIIw-6

The soil in this unit is a deep, nearly level, and very poorly drained silt loam formed from medium- to fine-textured stream deposits. It occurs on low flood plains, in old beaver pond sites, and where flooding from the smaller streams is frequent. It is very slowly permeable and is usually acid in the upper layers and slightly acid below. The soil in this unit is—

Saco silt loam.

This soil is marshy in many places but may be used for limited grazing where flooding is less frequent. Tree growth is usually poor. The vegetation includes a lot of alder, sedges, rushes, and other hydrophytic plants. Many areas of this soil are ideal for the development of habitats for marsh wildlife.

CAPABILITY UNIT VIIw-9

This unit consists of deep organic deposits of peat and muck that are very poorly drained. The peat and muck in the undifferentiated unit (Peat and muck) are mainly unclassified and need to be examined in detail for any prospective use. This unit consists of—

Muck.
Peat, coarsely fibrous.
Peat, moderately fibrous.
Peat and muck.

These organic soils produce trees in some places. They provide shelter for deer, moose, and aquatic animals. The muck needs some study; it may be suitable for drainage and improvement for production of crops.

CAPABILITY UNIT VIIs-1

These extremely rocky soils and land types are sloping to steep and are very shallow over bedrock. In this unit are

Canaan extremely rocky sandy loam, 5 to 15 percent slopes.
Canaan extremely rocky sandy loam, 15 to 45 percent slopes.

Figure 5.—Areas of Hermon extremely stony sandy loam, 5 to 15 percent slopes, showing size of boulders that are common on this soil.

Rockland, Canaan material, sloping.
Rockland, Canaan material, strongly sloping.
Rockland, Thorndike material, sloping.
Rockland, Thorndike material, strongly sloping.

These rough and steep areas are used only for woodland and wildlife. Rockland is generally too shallow to produce good commercial timber and is best used for recreation. Rockland areas provide some roadbuilding materials and have some granite quarries.

CAPABILITY UNIT VIIs-3

This unit consists of deep, steep, very stony soils and strongly sloping to steep, extremely stony soils (fig. 5). In the unit are—

Hermon very stony sandy loam, 15 to 45 percent slopes.
Hermon extremely stony sandy loam, 5 to 15 percent slopes.
Plaisted very stony loam, 15 to 45 percent slopes.
Plaisted extremely stony loam, 5 to 15 percent slopes.
Stony land, Hermon material, strongly sloping.
Stony land, Plaisted material, strongly sloping.

These areas are too steep, too stony, or both, for any use except woodland or wildlife habitats. The steepness and stoniness make the harvesting of timber difficult. Woods roads should not be located on these soils if this can be avoided.

CAPABILITY UNIT VIIs-5

This unit consists of strongly sloping to steep, very droughty loamy sands and coarse cobbly sandy loam. The soils are very friable and very rapidly permeable to water. They are usually very acid except in some of the deepest deposits, where there are calcite coatings on some of the gravel. The soils in this unit are—

Adams loamy sand, 15 to 45 percent slopes.
Colton cobbly sandy loam, dark materials, 15 to 25 percent slopes.
Colton cobbly sandy loam, dark materials, 25 to 45 percent slopes.
Colton loamy fine sand, dark materials, 15 to 25 percent slopes.

These steep soils are best suited to woods. Pines are the preferred trees. It is important to maintain a cover on

these areas to help control blowing of sand during high winds.

CAPABILITY UNIT VIIsw-3

This unit consists of nearly level to sloping, stony and rocky, poorly drained and very poorly drained silty soils. These soils formed from glacial till and silt and clay deposits. The soils from silt and clay deposits are mainly stony on the surface. The soils in this unit are—

Buxton, Scantic, and Biddeford stony silt loams, 0 to 8 percent slopes.
Monarda and Burnham very stony silt loams, 0 to 8 percent slopes.
Monarda and Burnham extremely stony silt loams, 0 to 15 percent slopes.

These soils are too wet, stony, or rocky for any use other than for woods or wildlife habitats. Woods roads are difficult to construct and maintain on these areas. Logging operations are difficult on the extremely stony Monarda and Burnham soils.

CAPABILITY UNIT VIIIw-6

This capability unit consists of sand and gravel bars along rivers and streams. The bars are subject to very frequent flooding and are covered with water during part of each year. The land type in this unit is—

Riverwash.

These areas of soil material are nearly devoid of vegetation, but they have some value for wildlife or recreation.

CAPABILITY UNIT VIIIw-9

This unit consists of deep to shallow deposits of peat that are very poorly drained. The peat is extremely acid and is usually more than 10 feet deep. In some bogs it is as deep as 30 to 40 feet. In general, the deposits are shallow, but in some places there is ponded water near the center of the bog. In this unit is—

Peat, sphagnum.

Peat, sphagnum, is useful primarily for wildlife habitats. No sphagnum peat has been mined in Penobscot County.

CAPABILITY UNIT VIIIs-1

This unit consists of rock outcrop with very little soil (see fig. 4). It occurs on mountainous and rough areas where high cliffs and talus slopes are common. The only vegetation occurs where a few inches of soil material have accumulated. It consists of scattered trees and clumps of ground hemlock (*Juniperus communis* var. *depressa*). Many of the outcrops are bare or have only lichens and mosses. In this unit is—

Rock outcrop.

This land type is used primarily for recreation, mining, or wildlife habitats.

General Use and Management

Some intensive uses of the soils that are considered safe are given in the descriptions of the different capability units. In general, any soil that is suitable for crops is likewise suitable for pasture. Exceptions are some of the sandy soils, especially the droughty ones, and the shallow soils. These soils may produce early maturing crops satisfactorily, but they would be poor for pasture from midsummer on, when dry weather usually occurs. Nearly all of the soils that are suitable for crops or pasture are likewise suitable for woods or wildlife habitats.

Cropland.—All soils used for crops should be managed according to the following principles: (1) Crops are selected to suit the soil and climate; (2) fertilizer and lime are applied in amounts that will produce good yields and according to needs determined by soil tests; (3) the content of organic matter is maintained by proper cropping systems that include grass or cover crops and green-manure crops, by conserving crop residues, and by applying manure; (4) contour farming, stripcropping, and similar practices are used as needed to control runoff and to reduce the risk of erosion; and (5) suitable drainage is provided for wet areas.

The three leading crops grown in the county are potatoes, oats, and hay. These are the crops mainly used in cropping systems. Silage corn or a cash crop sometimes replaces potatoes in a cropping system that lasts 3 to 5 years. The length of time depends on how long the hay is left. Cover crops and green-manure crops are also used on sloping land where a row crop is grown frequently or continuously.

Pasture.—All soils used for pasture should be managed according to the following principles: (1) Lime and fertilizer are applied in amounts determined by crop needs and soil tests; (2) grazing is so regulated that a good cover of sod is kept on the land; (3) cattle are kept off pastures when they are so wet that trampling causes compaction or cuts up the sod; (4) weeds and brush are controlled; (5) rundown pastures are renovated by reseeding, by overseeding, or by use of lime and fertilizer.

Pastures in Penobscot County are principally of two kinds—permanent, improved pastures capable of supporting a cow an acre through the grazing season, and unimproved or brush pastures, often called exercise grounds. The improved pastures grow best and respond best to treatment in the southern end of the county. In this part, medium- and fine-textured, moderately well drained to somewhat poorly drained soils are common. These are primarily the Buxton soils in the basin of the Penobscot River, and the Dixmont soils around Corinna and the southwestern border of the county. The Dixmont soils also occur near Carroll and Lee in the east-central wing of the county. The Daigle soils, also suitable for pasture, occur around Patten in the northeastern part of the county. Other soils are well suited to permanent pastures, but those that are not too well drained hold moisture better for the grasses during the dry summer. Rotation of pastures is common, and the second growth in hayfields is often grazed in fall.

Suitability of the Soils for the Important Crops of the County[1]

Farming must now be considered a big business. For farming to be highly successful, each acre must be managed according to its capability and must be planted to the crop best suited to the area. Consequently, a brief discussion of the suitability of the soils for the important crops in the county is given in this section.

[1] By Roland A. Struchtemeyer, head, Department of Agronomy, University of Maine.

Most of the soils of Penobscot County are well enough drained for the production of hay and pasture, provided they are adequately fertilized and limed. However, because of the diversity in drainage and in depth of the soils, the selection of different forage plants for different soils is necessary for efficient production.

The deep, well-drained soils of the county are best suited to alfalfa, usually in mixture with bromegrass. The soils of this group derived from glacial till are especially desirable for alfalfa, partly because of good natural slope that reduces the incidence of ice-sheet damage. In addition, some of the till soils are derived from calcareous parent materials and therefore provide a source of subsoil lime. Alluvial soils are less well suited because they are relatively flat in many places and hence more subject to damage from ice sheets. Alfalfa may be used to advantage on these soils in shorter rotations, usually with clover as well as a grass.

The moderately well drained soils of the county are better suited to alfalfa-clover mixtures than to alfalfa grown as the only legume. Simple alfalfa-timothy or alfalfa-bromegrass mixtures may sometimes be used on the gentler slopes, but usually ladino clover or red clover is included for insurance. Birdsfoot trefoil may be used in preference to alfalfa on the alluvial soils of this group, as it is better suited to the poorer surface drainage and is less likely to be damaged by ice sheets.

The shallow soils of the county are less desirable for forage production because of their limited water supply and restricted rooting zone. However, alfalfa may be grown on these soils where they are closely associated with areas of deeper soils, provided extra care is taken to supply an abundance of lime and fertilizer. Red clover or ladino clover should be included, along with a grass.

The poorly drained soils are best used for growing late-maturing, long-lived forage plants that decrease in feeding value more slowly than alfalfa or red clover. Alsike clover or birdsfoot trefoil, in mixture with a late variety of timothy, is best suited. Reed canarygrass should be substituted for timothy in fields containing large areas of very poorly drained soils.

Management for forage is limited essentially to cropping systems where the hay and pasture are obtained from the same soil types. The old runout permanent pasture is a thing of the past. Under present management most of the pastures on dairy farms are rotation pastures. Some permanent bluegrass pastures still have some value for beef cattle and sheep or provide early grazing for dairy cattle. Areas used for these pastures usually have undesirable drainage or are somewhat rougher than those suitable for rotation pastures.

Since potatoes are a high investment crop, they should be grown only on soils that will generally assure a maximum yield of high quality. The best potato soils are those that are deep and well drained or moderately well drained. These soils permit the root and tuber development needed for high yields.

Potatoes will produce satisfactorily on the excessively drained or shallow soils only if supplementary irrigation is used.

Poorly or very poorly drained soils should not be planted to potatoes. Potatoes are not suited to such soils—they do not like "wet feet." In many places, drainage will make these soils suitable for potatoes. Many poorly drained spots in large, adequately drained fields are drained in an attempt to make production on the entire area uniform.

All the soils suited to potatoes should be fertilized and limed according to needs determined by soil tests.

In large part, the soils in this county are suited to small grains, including oats, wheat, barley, buckwheat, and rye.

Many of the soils are generally well suited to spring oats. Oats do well on the moderately well drained soils of high water-holding capacity. Waterlogged areas are, of course, not suitable for oats, and shallow soils do not produce abundant yields. The ideal soil for oats is a loam or sandy loam with a subsoil that is retentive of moisture. For highest yields, oats require a moderately high level of fertility. They tend to lodge, however, on highly fertile soils supplied with excessive amounts of nitrogen. Oats do well on medium acid soils (pH 5.5 to 6.0); they respond to liming on more acid soils.

Wheat and barley both require a very well drained soil of high water-holding capacity. On wet soils, excessive lodging and excessive damage by disease may occur. Since wheat and barley require a fairly high pH (6.0 or above), most of the soils planted to these crops need lime.

In general, the following small grains have a decreasing tolerance to low pH in the order given: Buckwheat, rye, oats, wheat, and barley. They have an increasing need for high fertility in the same order.

If sweet corn is grown, it should be planted only on the so-called early soils. This is because of the length of time required to grow a crop of sweet corn and the earliness of frost in fall. Generally, corn production will be limited to the excessively drained or well-drained soils.

Beans, because of their shorter growing season, can be planted later. They can therefore be planted on some of the moderately well drained soils. Planting beans on poorly or very poorly drained soils will be a gamble.

Both sweet corn and beans need fertilizer and lime if they are to produce profitable yields. The amount of fertilizer and lime used should be determined by soil tests.

Lime and Fertilizer [2]

The soils in Penobscot County are all acid in the surface soil and subsoil. They are also very low in natural fertility. They therefore need lime and fertilizer to produce optimum yields. If the soils are properly limed and fertilized, most of them are surprisingly productive.

Because the soils are very acid, sizable quantities of lime are needed to bring the pH to the level needed by all the crops generally grown except potatoes. A large quantity of lime per acre is needed to produce the desired pH change for crops requiring a slightly acid soil. Consequently, only the surface soil of a few acres can be properly treated at one time. Better results will be obtained by properly treating a few acres than by using a light application of lime on a large acreage. In all cases, liming practices should be based on soil tests.

The benefits from the use of lime are many. Lime on Maine soils supplies calcium to the plants, encourages the

[2] By Cecil S. Brown, associate professor of agronomy, University of Maine.

growth of many helpful bacteria, increases the availability of applied fertilizers, and neutralizes toxic material in the soil. These are only a few of the benefits obtained from using adequate amounts of lime. They should be enough, however, to convince farmers of the value of using the required amounts.

For all crops except legumes, a complete fertilizer—one containing nitrogen, phosphorus, and potassium—will be needed. Although soils cropped frequently to potatoes or vegetables have accumulated some fertility, they still need some fertilizer to give the crop a quick start and to keep it growing throughout the season. For the most efficient production, each crop should be fertilized according to its own needs. These needs should be determined by soil tests. The Extension Service will supply information on fertilizer needs.

Enough phosphorus should be applied to legumes at seeding to start the seedlings and to carry the crop for a couple of years. Following the seeding, additional phosphorus and potassium should be applied as a topdressing when needed. Luxury consumption of potassium should be kept at a minimum.

Since the forage seedings in Maine are always a mixture of legumes and grasses, nitrogen should not be applied as long as the legumes are dominant. After the legumes have thinned out, however, the grass can produce some good yields of high-quality forage. To encourage the growth of grass, nitrogen should be applied along with other minerals when needed.

A farmer should always use the amount and kind of fertilizer and lime needed in his particular farming enterprise.

TABLE 1.—*Estimated average acre yields of the*

[Yields in columns A are to be expected under average management; those in columns B are to be expected under better than average management

Soil series	Dry beans		Snap beans		Corn silage		Sweet corn (snapped ears)	
	A	B	A	B	A	B	A	B
	Bu.	*Bu.*	*Lb.*	*Lb.*	*Tons*	*Tons*	*Tons*	*Tons*
Adams loamy sand, 0 to 8 percent slopes [4]	------	15	------	3,000	------	8.0	------	3.0
Adams loamy sand, 8 to 15 percent slopes [4]	------	12	------	2,500	------	6.0	------	2.5
Allagash fine sandy loam, 0 to 2 percent slopes	12	22	5,000	11,800	7.5	10.0	3.5	4.5
Allagash fine sandy loam, 2 to 8 percent slopes	12	22	4,500	11,000	7.0	9.5	3.0	4.5
Allagash fine sandy loam, 8 to 15 percent slopes	9	20	4,000	10,000	6.5	8.5	2.5	4.0
Allagash fine sandy loam, 15 to 25 percent slopes	8	18	3,500	9,000	5.0	7.0	1.75	2.5
Bangor silt loam, 0 to 2 percent slopes	22	35	5,600	12,500	12.0	18.0	5.0	6.0
Bangor silt loam, 2 to 8 percent slopes	22	35	5,500	12,000	11.0	17.0	4.75	6.0
Bangor silt loam, 8 to 15 percent slopes	20	32	5,000	10,500	10.0	15.0	4.0	5.5
Bangor silt loam, 15 to 25 percent slopes	17	28	4,000	9,000	8.5	14.0	3.0	5.0
Bangor silt loam, moderately deep, 2 to 8 percent slopes	22	35	5,000	11,500	10.0	13.0	4.0	5.5
Bangor silt loam, moderately deep, 8 to 15 percent slopes	20	30	4,500	10,500	9.0	12.0	3.5	5.0
Bangor silt loam, moderately deep, 15 to 35 percent slopes	18	25	3,500	9,000	6.0	9.0	2.0	3.75
Buxton silt loam, 0 to 2 percent slopes	10	20	5,000	7,000	8.0	12.0	3.8	4.2
Buxton silt loam, 2 to 8 percent slopes	10	22	5,000	7,500	8.0	14	4.0	4.5
Buxton silt loam, 8 to 15 percent slopes	8	18	4,000	6,000	6.0	10	2.0	3.0
Colton gravelly sandy loam, dark materials, 0 to 2 percent slopes	20	28	4,000	9,000	9.0	12	2.5	4.5
Colton gravelly sandy loam, dark materials, 2 to 8 percent slopes	18	28	4,000	9,000	9.0	12	2.5	4.0
Colton gravelly sandy loam, dark materials, 8 to 15 percent slopes	14	20	2,800	8,000	7.5	10.0	2.0	3.5
Colton gravelly sandy loam, dark materials, 15 to 25 percent slopes	12	18	1,800	6,800	6.0	8.0	1.5	2.75
Colton loamy fine sand, dark materials, 0 to 2 percent slopes [4]	------	16	------	3,200	------	9.0	------	3.2
Colton loamy fine sand, dark materials, 2 to 8 percent slopes [4]	------	14	------	3,000	------	7.0	------	2.8
Colton loamy fine sand, dark materials, 8 to 15 percent slopes [4]	------	12	------	2,500	------	5.0	------	2.5
Colton cobbly sandy loam, dark materials, 0 to 8 percent slopes	------	14	------	3,000	------	7.0	------	2.8
Colton cobbly sandy loam, dark materials, 8 to 15 percent slopes	------	12	------	2,500	------	5.0	------	2.5
Daigle silt loam, 0 to 2 percent slopes	20	30	4,000	10,500	11.0	16.0	------	------
Daigle silt loam, 2 to 8 percent slopes	20	30	4,500	11,000	12.0	18.0	------	------
Daigle silt loam, 8 to 15 percent slopes	18	28	3,500	9,500	10.0	14.0	------	------
Daigle stony silt loam, 0 to 2 percent slopes	18	28	3,500	9,500	10.0	14.0	------	------
Daigle stony silt loam, 2 to 8 percent slopes	18	28	3,500	9,500	10.0	14.0	------	------
Daigle stony silt loam, 8 to 15 percent slopes	18	28	3,500	9,500	10.0	14.0	------	------
Dixmont silt loam, 0 to 2 percent slopes	20	30	4,000	10,500	11.0	16.0	3.2	5.2
Dixmont silt loam, 2 to 8 percent slopes	20	30	4,500	11,000	12.0	18.0	3.5	5.5
Dixmont silt loam, 8 to 15 percent slopes	18	28	3,500	9,500	10.0	14.0	2.5	4.5
Elmwood fine sandy loam, 0 to 8 percent slopes	20	28	5,000	11,500	10.0	13.0	4.0	5.5
Hadley silt loam	12	22	5,000	11,800	7.5	10.0	3.5	4.5
Hermon sandy loam, moderately deep, 2 to 8 percent slopes	12	22	4,000	5,000	7.5	10.0	3.0	4.0
Hermon sandy loam, moderately deep, 8 to 15 percent slopes	10	20	3,000	4,500	6.0	9.0	2.0	3.5
Hermon sandy loam, 2 to 8 percent slopes	14	24	4,000	5,500	8.0	10.5	3.0	4.0

See footnotes at end of table.

Estimated Yields

The estimated average acre yields of the principal crops on the soils of the county suitable for cultivation are given in table 1. Yields are given for the soils under two levels of management.

Yield figures are based on the results of trials and tests at the experiment station; individual records from farmers; and records on canning crops, partly from farmers and partly from canning company officials. Yield data apply primarily to cleared soils that are either stone free or have had the stones removed. Some of these soils are not used very much for crops now, but they could be cropped if necessary. Yields estimated for soils for which data are not available are based on comparison with similar soils for which data are available. Considered in the comparisons were productivity, management history, crop suitability, drainage needs, degree of droughtiness, and other characteristics.

Yields in columns A are to be expected on the soils under average management. Such management includes average use of rotations, average applications of lime and fertilizer, some cultivation up and down hill, little if any drainage practices, and no irrigation.

Yields in columns B are to be expected under better than average management. This management includes the use of good rotations; use of the best fertilizer and liming practices; installation of drainage or irrigation where needed; and use of contour farming, stripcropping, diversion ditches, and other conservation measures. Such management is discussed in the sections "General Use and Management" and "Management by Capability Units."

principal crops on soils suitable for cultivation

management (see text for definitions of the two levels of management). Absence of yield indicates that the crop is not suitable under the specified]

Timothy		Timothy or bromegrass with clover		Alfalfa and bromegrass		Oats		Peas (canning)		Potatoes [1]		Apples [2]		Pasture	
A	B	A	B	A	B	A	B	A	B	A	B	A	B	A	B
Tons	*Tons*	*Tons*	*Tons*	*Tons*	*Tons*	*Bu.*	*Bu.*	*Lb.*	*Lb.*	*Bu.*	*Bu.*	*Bu.*	*Bu.*	*Cow-acre-days* [3]	*Cow-acre-days* [3]
------	2.0	------	1.75	------	2.75	------	60	------	2,500	------	300	------	------	------	90
------	1.5	------	1.25	------	1.75	------	------	------	------	------	275	------	------	------	85
1.5	3.5	1.75	3.0	1.5	3.5	50	70	2,400	3,000	275	450	------	------	90	120
1.25	3.0	1.75	3.0	1.5	3.25	50	70	2,200	3,000	275	450	------	------	70	100
1.0	2.75	1.25	3.0	1.25	3.0	45	60	2,000	2,800	250	400	------	------	70	90
.75	2.0	1.0	2.5	1.0	2.5	------	------	------	------	------	------	------	------	60	80
2.2	3.8	2.1	3.5	3.5	5.0	55	75	2,600	3,300	375	575	------	------	125	270
2.0	3.5	1.85	3.25	3.0	4.5	55	75	2,400	3,200	375	575	450	720	120	270
1.75	3.0	1.5	2.75	2.5	4.0	50	70	2,200	3,000	300	500	400	600	90	200
1.25	2.5	1.25	2.0	2.0	3.5	45	60	------	------	------	------	300	450	90	150
2.5	3.5	2.25	3.25	2.8	4.5	55	75	2,600	3,200	350	600	200	350	100	235
2.0	3.0	1.75	3.0	2.0	3.8	50	70	2,200	3,000	300	550	185	350	85	140
1.25	2.0	1.25	2.0	1.5	3.0	45	60	------	------	------	------	150	275	65	100
1.5	3.5	1.25	2.75	1.25	2.25	45	60	------	------	------	------	------	------	90	225
1.5	3.5	1.25	3.0	1.25	2.5	45	60	------	------	------	------	------	------	85	225
1.0	2.75	1.0	2.0	1.0	2.0	45	60	------	------	------	------	------	------	------	200
2.0	3.0	2.0	2.75	2.5	3.25	45	60	2,400	3,000	300	400	------	------	65	100
1.8	2.8	1.5	2.5	2.25	3.0	45	60	2,200	2,800	275	400	------	------	65	100
1.5	2.5	1.0	2.0	1.75	2.75	------	------	------	------	250	350	------	------	------	85
1.25	2.0	.75	1.75	1.0	2.5	------	------	------	------	------	------	------	------	------	------
------	2.0	------	1.75	------	2.25	------	60	------	2,500	------	300	------	------	------	85
------	1.5	------	1.25	------	2.0	------	60	------	2,500	------	300	------	------	------	85
------	1.25	------	1.0	------	1.5	------	------	------	------	------	275	------	------	------	65
------	1.5	------	1.25	------	2.0	------	------	------	------	------	------	------	------	------	85
------	1.25	------	1.0	------	1.5	------	------	------	------	------	------	------	------	------	65
2.0	3.5	1.5	3.0	2.5	3.5	55	70	------	------	275	350	------	------	120	270
2.2	3.8	1.75	3.0	2.75	4.0	55	70	------	------	275	350	------	------	125	270
1.75	2.75	1.25	3.0	2.0	3.0	55	70	------	------	275	350	------	------	90	200
1.75	2.75	1.25	2.25	2.0	3.0	50	65	------	------	275	340	------	------	90	200
1.75	2.75	1.25	2.25	2.0	3.0	50	65	------	------	275	340	------	------	90	200
1.75	2.75	1.25	2.25	2.0	3.0	50	65	------	------	275	340	------	------	90	200
2.0	3.5	1.5	2.5	2.5	3.5	45	60	2,000	3,000	275	350	------	------	120	270
2.2	3.8	1.75	2.7	2.75	4.0	45	60	2,000	3,000	275	350	------	------	125	270
1.75	2.75	1.25	2.25	2.0	3.0	45	60	2,000	2,800	275	350	------	------	90	200
2.0	3.5	1.25	2.0	1.75	3.75	45	60	2,400	3,000	275	350	------	------	100	225
1.5	3.5	1.75	3.5	1.5	3.5	50	70	2,400	3,000	300	450	------	------	90	120
1.5	3.0	1.0	2.5	1.75	3.0	45	60	------	------	275	350	------	------	85	130
1.4	2.0	.75	2.0	1.5	2.5	45	60	------	------	275	350	------	------	------	100
1.6	3.0	1.0	2.5	2.0	3.0	45	60	------	------	300	400	------	------	95	135

TABLE 1.—*Estimated average acre yields of the principal*

Soil series	Dry beans		Snap beans		Corn silage		Sweet corn (snapped ears)	
	A	B	A	B	A	B	A	B
	Bu.	*Bu.*	*Lb.*	*Lb.*	*Tons*	*Tons*	*Tons*	*Tons*
Hermon sandy loam, 8 to 15 percent slopes	12	20	2, 800	4, 800	6. 0	9. 0	2. 25	3. 75
Howland gravelly loam, 0 to 8 percent slopes	20	28	4, 200	10, 000	10. 0	13. 0	3. 25	5. 0
Howland gravelly loam, 8 to 15 percent slopes	18	25	3, 000	9, 000	8. 0	11. 0	3. 0	4. 5
Machias fine sandy loam, 0 to 8 percent slopes	18	25	4, 500	10, 000	9. 0	12. 5	3. 5	5. 0
Madawaska very fine sandy loam, 0 to 8 percent slopes	18	25	4, 500	10, 000	9. 0	12. 5	3. 5	5. 0
Melrose fine sandy loam, 0 to 2 percent slopes	20	30	5, 600	12, 000	11. 0	14. 0	4. 5	5. 5
Melrose fine sandy loam, 2 to 8 percent slopes	20	30	5, 000	12, 000	11. 0	14. 0	3. 5	5. 0
Melrose fine sandy loam, 8 to 15 percent slopes	18	28	3, 500	10, 000	8. 0	11. 0	2. 75	4. 5
Monarda silt loam, 0 to 8 percent slopes	10	18	2, 000	4, 000	9. 0	12. 0	1. 75	3. 5
Ondawa fine sandy loam	12	22	5, 000	11, 800	7. 5	10. 0	3. 5	4. 5
Perham silt loam, 0 to 8 percent slopes	22	35	5, 500	12, 000	11. 0	17. 0	------	------
Perham silt loam, 8 to 15 percent slopes	20	32	5, 000	10, 500	10. 0	15. 0	------	------
Perham stony silt loam, 0 to 8 percent slopes	17	28	4, 000	9, 000	8. 5	14. 0	------	------
Perham stony silt loam, 8 to 15 percent slopes	17	28	4, 000	9, 000	8. 5	14. 0	------	------
Plaisted gravelly loam, 2 to 8 percent slopes	22	32	4, 500	11, 000	11. 0	14. 0	3. 5	5. 0
Plaisted gravelly loam, 8 to 15 percent slopes	18	28	4, 000	10, 000	8. 0	13. 0	2. 75	4. 75
Plaisted gravelly loam, 15 to 25 percent slopes	15	24	3, 500	8, 500	6. 0	10. 0	2. 0	3. 75
Podunk fine sandy loam	------	------	------	------	9. 0	12. 5	------	------
Red Hook and Atherton fine sandy loams, 0 to 8 percent slopes	10	18	2, 000	4, 000	9. 0	12. 0	1. 75	3. 5
Red Hook and Atherton silt loams, 0 to 8 percent slopes	10	18	2, 000	4, 000	9. 0	12. 0	1. 75	3. 5
Scantic silt loam, 0 to 8 percent slopes	10	15	1, 800	3, 500	6. 0	10. 0	1. 5	3. 0
Stetson fine sandy loam, 0 to 2 percent slopes	20	33	5, 000	11, 500	10. 0	13. 0	4. 0	5. 5
Stetson fine sandy loam, 2 to 8 percent slopes	20	33	4, 000	11, 000	9. 0	13. 0	4. 0	5. 5
Stetson fine sandy loam, 8 to 15 percent slopes	16	28	3, 000	10, 000	8. 0	11. 0	3. 0	5. 0
Stetson fine sandy loam, 15 to 25 percent slopes	14	25	2, 000	7, 500	6. 0	9. 0	2. 25	4. 5
Stetson-Suffield complex, 0 to 15 percent slopes	15	24	5, 000	10, 000	7. 5	10. 0	3. 5	5. 0
Suffield very fine sandy loam, 0 to 2 percent slopes	20	28	5, 000	10, 500	9. 0	12. 0	4. 2	5. 2
Suffield very fine sandy loam, 2 to 8 percent slopes	22	30	5, 500	11, 000	7. 0	13. 0	4. 5	5. 5
Suffield very fine sandy loam, 8 to 15 percent slopes	15	24	4, 000	9, 000	6. 0	10. 0	3. 0	4. 0
Suffield very fine sandy loam, 15 to 25 percent slopes	15	24	4, 000	9, 000	6. 0	10. 0	3. 0	4. 0
Suffield silt loam, 0 to 2 percent slopes	20	28	5, 400	11, 000	8. 5	12. 0	4. 75	5. 75
Suffield silt loam, 2 to 8 percent slopes	22	30	5, 600	12, 000	9. 0	13. 0	4. 75	5. 75
Suffield silt loam, 8 to 15 percent slopes	15	24	5, 000	10, 000	7. 5	10. 0	3. 5	5. 0
Suffield silt loam, 15 to 25 percent slopes	12	20	4, 000	7, 500	6. 0	8. 0	2. 5	4. 0
Suffield silt loam, 8 to 15 percent slopes, eroded	15	24	5, 000	10, 000	7. 5	10. 0	3. 5	5. 0
Suffield silt loam, 15 to 25 percent slopes, eroded	12	20	4, 000	7, 500	6. 0	8. 0	2. 5	4. 0
Thorndike shaly silt loam, 2 to 8 percent slopes	18	28	4, 500	10, 500	8. 0	11. 0	3. 0	4. 5
Thorndike shaly silt loam, 8 to 15 percent slopes	14	22	3, 000	9, 000	6. 0	9. 0	2. 0	3. 5
Thorndike shaly silt loam, 15 to 25 percent slopes	------	------	------	------	------	------	------	------
Winooski silt loam	------	------	------	------	9. 0	12. 5	------	------

[1] Based on Katahdin variety.
[2] McIntosh is chief variety.

In general, the deep and moderately deep, well-drained soils from till, along with well-drained soils of the bottom land, are the most productive. The acreage of the well-drained soils of the bottom land, however, is small in Penobscot County. Under proper management, including some drainage practices, the moderately well drained soils will often approach the well-drained soils in production. The fine sandy loam soils from outwash, if irrigated and liberally fertilized, will also be nearly as productive as any. If properly managed, the well drained and moderately well drained soils from silt and clay that are only moderately sloping are especially productive of hay and pasture. The very shallow soils, coarse-textured soils, and poorly or very poorly drained soils cannot be made as productive as the others without excessive cost.

There is not much data on pasture production in the county. The figures in table 1 are based on what has been produced on improved pastures on some of the soils.

Engineering Uses of Soils

This soil survey report contains information that can be used by engineers to:

1. Make soil and land use studies that will aid in the selection and development of industrial, business, residential, and recreational sites.
2. Make preliminary estimates of runoff and erosion characteristics and engineering properties of the soils for use in designing drainage structures and planning dams and other structures for water and soil conservation. (The approximate amount of water needed for irrigation on the different soils can also be determined from the data given in this report.)
3. Make reconnaissance surveys of soil and ground conditions that will aid in selecting highway and air-

crops on soils suitable for cultivation—Continued

Timothy		Timothy or bromegrass with clover		Alfalfa and bromegrass		Oats		Peas (canning)		Potatoes [1]		Apples [2]		Pasture	
A	B	A	B	A	B	A	B	A	B	A	B	A	B	A	B
Tons	*Tons*	*Tons*	*Tons*	*Tons*	*Tons*		*Bu.*	*Bu.*	*Lb. Lb.*	*Bu.*	*Bu.*	*Bu.*	*Bu.*	*Cow-acre-days* [3]	*Cow-acre-days* [3]
1. 4	2. 0	. 75	2. 0	1. 75	2. 5	45	60	----	----	300	400	----	----	65	110
2. 25	3. 5	1. 5	3. 0	2. 0	3. 5	45	60	----	----	275	350	----	----	100	225
1. 5	2. 75	1. 25	2. 5	1. 5	2. 75	45	60	----	----	275	350	----	----	85	200
1. 8	3. 3	1. 75	3. 0	2. 0	3. 0	45	60	----	----	275	350	----	----	100	150
1. 8	3. 3	1. 75	3. 0	2. 0	3. 0	45	60	----	----	275	350	----	----	100	150
2. 1	3. 6	1. 5	2. 4	3. 0	5. 0	50	70	2, 500	3, 200	350	450	----	----	100	230
1. 75	3. 0	1. 5	2. 25	3. 0	4. 75	50	70	2, 500	3, 200	350	450	----	----	100	200
1. 5	2. 75	1. 25	2. 0	2. 5	4. 0	45	60	2, 000	3, 000	300	400	----	----	85	150
2. 4	3. 5	1. 75	3. 0	----	----	----	----	----	----	----	----	----	----	85	150
1. 5	3. 5	1. 75	3. 25	1. 5	3. 5	50	70	2, 400	3, 000	300	450	----	----	90	120
2. 0	3. 5	1. 85	3. 25	3. 0	4. 5	60	75	2, 400	3, 200	350	500	450	720	120	270
1. 75	3. 0	1. 5	2. 75	2. 5	4. 0	60	75	2, 000	3, 000	350	500	400	600	90	200
1. 25	2. 5	1. 25	2. 0	2. 0	3. 5	50	70	----	----	275	400	300	450	90	150
1. 25	2. 5	1. 25	2. 0	2. 0	3. 5	50	70	----	----	275	400	300	450	90	150
2. 5	3. 5	2. 25	3. 25	2. 8	4. 0	55	70	2, 400	3, 000	350	450	300	450	100	225
2. 2	3. 0	2. 0	2. 75	2. 5	3. 5	55	70	2, 000	2, 800	300	450	200	350	85	200
1. 5	2. 5	1. 5	2. 5	2. 0	3. 0	----	----	----	----	----	----	150	250	85	140
1. 8	3. 0	1. 0	2. 75	----	----	----	----	----	----	----	----	----	----	85	200
2. 4	3. 5	1. 75	3. 0	----	----	----	----	----	----	----	----	----	----	85	150
2. 4	3. 5	1. 75	3. 0	----	----	----	----	----	----	----	----	----	----	85	150
1. 0	3. 0	. 8	2. 5	----	----	----	----	----	----	----	----	----	----	65	140
2. 5	3. 5	2. 25	3. 0	2. 75	4. 5	50	70	2, 400	3, 000	300	450	----	----	100	235
2. 2	3. 3	2. 0	3. 0	2. 5	4. 0	50	70	2, 200	3, 000	300	450	----	----	85	200
2. 0	3. 0	1. 75	3. 0	2. 0	3. 5	45	60	----	----	275	400	----	----	85	100
1. 5	2. 5	1. 5	2. 5	1. 75	2. 75	----	----	----	----	----	----	----	----	----	85
1. 8	2. 8	1. 75	2. 5	1. 5	2. 5	----	----	----	----	----	----	----	----	85	100
2. 2	3. 7	2. 0	3. 5	1. 75	2. 75	50	65	2, 200	3, 000	----	----	----	----	100	235
2. 2	3. 6	2. 0	3. 5	1. 75	2. 75	50	65	2, 200	3, 000	----	----	----	----	85	230
2. 0	3. 0	1. 8	3. 0	1. 5	2. 25	45	60	----	----	----	----	----	----	65	100
2. 0	3. 0	1. 8	3. 0	1. 5	2. 25	----	----	----	----	----	----	----	----	65	100
2. 2	3. 7	2. 0	3. 5	2. 0	2. 8	50	65	----	----	----	----	----	----	100	235
2. 2	3. 6	2. 0	3. 4	1. 75	2. 8	50	65	----	----	----	----	----	250	100	230
1. 8	2. 8	1. 75	2. 5	1. 5	2. 5	45	60	----	----	----	----	----	250	85	100
1. 5	2. 5	1. 5	2. 25	1. 25	2. 0	----	----	----	----	----	----	----	----	65	85
1. 8	2. 8	1. 75	2. 5	1. 5	2. 5	----	----	----	----	----	----	----	250	85	100
1. 5	2. 5	1. 5	2. 25	1. 25	2. 0	----	----	----	----	----	----	----	----	65	85
1. 4	2. 5	1. 25	2. 5	1. 5	2. 5	50	70	2, 200	3, 000	300	450	----	----	35	100
1. 0	2. 0	1. 0	2. 5	1. 0	2. 0	45	60	----	----	275	400	----	----	35	85
1. 8	3. 0	1. 0	3. 0	----	----	45	60	----	----	----	----	----	----	85	200

[3] Number of days 1 acre will graze a cow, horse, or steer, or 5 swine, or 7 sheep without injury to the pasture.
[4] Very dry, droughty soils: yields listed only in columns B, which indicate improved management that includes irrigation.

port locations and in planning detailed investigations of the intended locations.

4. Locate probable sources of sand and gravel for use in structures.
5. Correlate performance of engineering structures with mapping units and thus develop information that will be useful in designing and maintaining the structures.
6. Determine the suitability of soil mapping units for cross-country movements of vehicles and construction equipment.
7. Supplement information obtained from other published maps and reports and aerial photographs in order to make maps and reports that can be readily used by engineers.
8. Eliminate testing of materials obviously unsuited to specific uses.

The mapping and the descriptive reports are somewhat generalized, however, especially in the wooded areas, and should be used only in planning more detailed field surveys, investigations, and tests to determine the in-place condition of the soil at the site of the proposed engineering constructions.

This section of the report contains information about the soils that is particularly related to engineering use. Most of this information is in tables 2, 3, 4, and 5. Some terms used in this report have special meanings in soil science. These and other terms used in this report are defined in the Glossary.

Some information about the soils of Penobscot County can be obtained from the detailed soil map at the back of report. It is necessary, however, to refer to the sections "Descriptions of the Soils," and "Genesis, Classification, and Morphology of Soils" for many details. The soil profile descriptions as well as the soil map should be used in planning detailed surveys at construction sites.

TABLE 2.—*Engineering test data* [1] *for*

Soil name and location	Parent material	Bureau of Public Roads report No.	Depth	Horizon	Moisture-density [2]: Maximum dry density	Moisture-density [2]: Optimum moisture
			Inches		*Lb. per cu. ft.*	*Percent*
Bangor silt loam:						
4 miles north of Newport. (Modal profile.)	Slaty glacial till.	S34854	0–7	A_p	98	24
		S34855	8–20	B_{21}, B_{22}, and B_3	119	13
		S34856	31–45	C_2	122	12
(Clayey substratum.)	Fine-textured slaty glacial till.	S34857	10–16	B_{22}	103	22
		S34858	40–48	C_3	118	14
		S34859	60–68	D	119	14
South of Dexter near intersection of Route 7 and 94. (Alkaline substratum.)	Slaty glacial till.	S34860	4–12	B_{21} and B_{22}	111	14
		S34861	20–29	C_1	125	10
		S34862	50–65	C_3	122	12
		S34863	120–131	C_5	128	10
Colton loamy fine sand:						
1 mile northeast of Orono on River Road. (Nonmodal—deep to gravelly substratum.)	Recent sand and gravel alluvium.	S34851	3–10	A_p	105	17
		S34852	17–27	B_2	111	15
		S34853	36–46	D or C_2	133	8
1¼ miles north of Passadumkeag on Route 2. (Sandy subsoil.)	Recent sand and gravel alluvium.	S34845	0–9	A_p	102	20
		S34846	9–19	B_2	122	12
		S34847	36–44	C	130	11
2 miles north of Mattawamkeag near drive-in theater. (Modal profile.)	Recent sand and gravel alluvium.	S34848	0–9	A_p	104	18
		S34849	9–19	B_3	135	7
		S34850	40–52+	D	128	10
Monarda silt loam:						
¾ mile west of Corinna on back road to Newport. (Modal profile.)	Slaty glacial till.	S34864	0–7	A_p	98	22
		S34865	10–26	B_{31}, B_{32gm}	121	12
		S34866	38–50	B_{34gm}	124	10
2 miles south of Corinna on Route 222. (Very firm subsoil.)	Fine slaty glacial till.	S34867	0–8	A_p	102	19
		S34868	8–20	B_g	119	11
		S34869	20–30	C_g	123	10
4 miles north of Newport on Route 7. (Clayey subsoil.)	Fine-textured slaty glacial till.	S34870	0–12	A_p	106	16
		S34871	17–37	C_{1g}	120	12
		S34872	37–47	C_{2g}	121	12
Scantic silt loam:						
1¼ miles north of Old Town on Gilman Falls Road. (Modal profile.)	Fine-textured marine and lacustrine deposits.	S34876	0–7	A_p and B_g	90	35
		S34877	7–16	C_{g1}	115	16
		S34878	26 38	C_{g2}	108	20
1 mile south of Brewer on Route 1 near theater. (Brown subsoil.)	Fine-textured marine and lacustrine deposits.	S34873	0–7	A_p	96	23
		S34874	7–20	B_g	110	18
		S34875	30–40	C_{g2}	109	20
¼ mile west of Enfield on Howland Road. (Clay subsoil.)	Fine-textured marine and lacustrine deposits.	S34879	0–9	A_p	92	28
		S34880	9–19	B_g	104	23
		S34881	30–40	C_{g2}	111	18
Thorndike shaly silt loam:						
In woods 3 miles west of Route 11 on Mt. Chase crossroad. (Modal profile.)	Lime-seamed shale with glacial till.	S34882	3–30	B_{21}, B_{22}, and B_3	114	15
		S34883	20–30	C	128	11
2½ miles south of Dexter near Katen Corner in shale pit. (Shaly sample.)	Lime-seamed shale.	S34884	3–16	BC	116	14
1¼ miles west of Sherman Station near railroad crossing. (In shallow area of soil.)	Lime-seamed shale with glacial till.	S34885	2 12	BC	116	14

[1] Tests performed by the Bureau of Public Roads in accordance with standard procedures of the American Association of State Highway Officials (AASHO).

[2] Based on the Moisture-Density Relations of Soils Using 5.5-lb. rammer and 12-in. drop, AASHO Designation T 99–57, Method C or A. (Method A was used when the sample contained no particles that were retained on No. 4 sieve; method C was used for other samples.)

[3] Mechanical analyses according to the American Association of State Highway Officials Designation T 88. Results by this procedure frequently may differ somewhat from results that would have been obtained by the soil survey procedure of the Soil Conservation Service (SCS). In the AASHO procedure, the fine material is analyzed by the hydrometer method, and the various grain-size fractions are calculated on the basis of all the material, including that coarser than 2 millimeters in diameter. In the

soil samples taken from 15 soil profiles

Mechanical analysis[3]											Liquid limit[4]	Plasticity index[4]	Classification	
Percentage passing sieve—							Percentage smaller than—						AASHO[5]	Unified[6]
3 in.	¾ in.	⅜ in.	No. 4 (4.7 mm.)	No. 10 (2.0 mm.)	No. 40 (0.42 mm.)	No. 200 (0.074 mm.)	0.05 mm.	0.02 mm.	0.005 mm.	0.002 mm.				
100	98	97	96	94	82	66	62	43	23	12	43	9	A-5(7)	ML.
100	97	93	89	84	73	61	56	41	22	12	24	4	A-4(5)	ML-CL.
100	95	92	89	84	74	61	56	40	20	11	22	4	A-4(5)	ML-CL.
100	95	93	90	86	76	65	63	48	32	20	38	7	A-4(6)	ML.
------	100	99	97	92	80	66	64	55	39	27	26	8	A-4(6)	CL.
100	99	99	97	92	83	69	66	52	37	26	26	7	A-4(7)	ML-CL.
100	97	93	88	84	75	61	57	40	18	9	27	4	A-4(5)	ML-CL.
100	97	93	89	85	76	62	58	41	20	11	20	3	A-4(5)	ML.
100	94	91	88	85	76	62	58	40	18	8	22	4	A-4(5)	ML-CL.
100	92	87	83	78	68	48	41	26	12	6	18	2	A-4(3)	SM.
------	------	------	--------	100	89	34	30	20	10	5	NP	NP	A-2-4(0)	SM.
------	------	------	--------	100	86	28	24	15	8	4	NP	NP	A-2-4(0)	SM.
100	72	60	48	33	13	3	2	1	1	0	NP	NP	A-1-a(0)	GP.
100	100	99	98	95	77	52	47	33	18	10	38	6	A-4(3)	ML.
100	96	91	85	71	26	4	4	2	1	1	NP	NP	A-1-b(0)	SP.
100	80	66	54	41	16	4	3	2	1	1	NP	NP	A-1 a(0)	SP.
100	93	87	81	74	62	46	41	27	16	9	40	5	A-4(2)	SM.
100	74	59	47	36	20	9	8	5	3	2	NP	NP	A-1 a(0)	GW-GM.
100	90	78	66	52	21	4	3	2	1	0	NP	NP	A-1-b(0)	SP.
100	89	85	81	76	68	56	51	37	20	12	45	10	A-5(5)	ML.
100	94	92	90	86	76	58	53	36	19	12	24	3	A-4(5)	ML.
100	97	94	89	84	74	61	56	39	20	12	21	4	A-4(5)	ML-CL.
100	99	95	92	87	78	63	56	37	17	9	41	7	A-5(6)	ML.
100	99	97	94	88	76	54	48	30	12	6	20	1	A-4(4)	ML.
100	96	92	88	84	76	62	57	39	19	10	22	4	A-4(5)	ML-CL.
100	96	92	85	79	67	54	51	36	20	10	43	9	A-5(4)	ML.
100	99	98	95	90	81	68	63	43	22	11	22	3	A-4(7)	ML.
100	97	95	92	86	75	61	57	41	21	11	21	3	A-4(5)	ML.
------	------	------	--------	100	99	94	90	70	40	23	39	10	A-4(8)	ML.
------	------	------	--------	100	99	94	90	68	42	27	26	6	A-4(8)	ML-CL.
------	------	------	--------	--------	100	99	99	86	56	34	34	11	A-6(8)	ML-CL.
------	------	------	--------	100	99	98	96	77	44	26	42	11	A-5(8)	ML.
------	------	------	--------	100	97	94	92	74	46	30	33	11	A-4(8)	ML-CL.
------	------	------	--------	--------	--------	100	99	90	62	40	36	13	A-6(9)	ML-CL.
------	------	------	--------	100	91	86	85	77	59	41	53	15	A-7-5(13)	MH.
------	------	------	--------	100	98	94	93	85	71	52	42	16	A-7-6(11)	MH-CH.
------	------	------	--------	--------	100	98	95	79	56	40	31	11	A-4(8)	CL.
100	80	71	63	53	41	28	25	19	10	6	NP	NP	A-2-4(0)	GM.
100	85	73	62	50	32	18	16	12	8	4	NP	NP	A-1-b(0)	SM.
------	100	92	80	61	38	28	26	20	10	5	39	7	A-2-4(0)	SM.
100	94	87	78	69	52	41	38	28	16	8	31	4	A-4(1)	SM.

SCS soil survey procedure, the fine material is analyzed by the pipette method and the material coarser than 2 millimeters in diameter is excluded from calculations of grain-size fractions. The mechanical analyses used in this table are not suitable for use in naming textural classes for soils.

[4] NP in this column means nonplastic.

[5] Based on Standard Specifications for Highway Materials and Methods of Sampling and Testing (Pt. 1, Ed. 7): The Classification of Soils and Soil-Aggregate Mixtures for Highway Construction Purposes, AASHO Designation M 145-49.

[6] Based on the Unified Soil Classification System, Technical Memorandum No. 3-357, v. 1, Waterways Experiment Station, Corps of Engineers, March 1953.

These will help the engineer to concentrate on the most suitable soils, indicate sources of sand and gravel, and minimize the number of soil samples needed for laboratory testing.

Engineering Test Data and Interpretations

Engineering test data and interpretations are given in tables 2, 3, 4, and 5.

Samples of the principal soil types of five soil series were taken by the survey party and submitted to the Bureau of Public Roads for testing. These samples were tested in accordance with standard procedures to help evaluate the soils for engineering purposes. Mechanical analysis, liquid limits, and plastic limits are used to assist in the classification of soils in the AASHO and Unified systems. Results are shown in table 2. Although samples of each type were taken in three localities to show some variations in physical characteristics, they do not show the maximum variations possible in soils of the five series sampled. Except for those of the Bangor soils, all samples were obtained at depths of less than 6 feet. One sample of the substratum of Bangor silt loam was taken at about 120 inches (10 to 12 ft.) to supply information about the deeper silty till of this soil. Other samplings did not reach to such depth, however, and may not be suitable for estimating the characteristics of soil materials that occur in deep cuts in areas of rolling or hilly topography.

In table 2 (see pages 22 and 23), each sample is classified according to both the system of the American Association of State Highway Officials (AASHO) and the Unified system.

Most highway engineers classify soil materials according to the system approved by the American Association of State Highway Officials. In this system soil materials are classified in seven principal groups. The groups range from A–1, which consists of gravelly soils of high bearing capacity, to A–7, which consists of clay soils having a low strength when wet. In each group the relative engineering value of the soil material is indicated by a group index number. Group indexes range from 0 for the best material to 20 for the poorest. The group index number is shown in parentheses following the soil group symbol in the next to last column in table 2.

Some engineers prefer to use the Unified soil classification system. In this system soil materials are divided into 15 classes: 8 classes are for coarse-grained materials (GW, GP, GM, GC, SW, SP, SM, SC), 6 for fine-grained materials (ML, CL, OL, MH, CH, OH), and 1 for highly organic material (Pt). Mechanical analyses are used to determine the GW, GP, SW, and SP classes of material; mechanical analyses, liquid limit, and plasticity index are used to determine GM, GC, SM, SC, and fine-grained soils. In tables 2 and 4, the soils of the county have been classified only in the GW, GP, GM, GC, SP, SM, ML, CL, MH, and CH classes.

In table 3, measurements of available moisture capacity have been made for 10 soil types at 14 different locations.

Moisture-retention data were obtained by using standard pressure equipment. Undisturbed soil cores were placed on ceramic plate apparatus to obtain the 1/3-atmosphere tension value. Moisture retention at 15 atmospheres was determined with disturbed (or fragmented) soil in the pressure membrane equipment. The bulk density of

TABLE 3.—*Available moisture capacity for selected soils* [1]

Soil and town in which located	Depth of horizon	Available moisture capacity	Available moisture capacity of horizon
	Inches	*Inches per inch of soil*	*Inches*
Allagash fine sandy loam (Greenbush)	0–9	0.14	1.26
	9–15	.17	1.02
	15–20	.13	.65
	20–42	.05	1.10
	42–48+	.06	--------
Bangor silt loam (Dexter)	0–5	.18	.90
	5–10	.22	1.10
	10–18	.18	1.44
	18–32	.18	2.52
	32–40+	.16	--------
Bangor silt loam (Newport)	0–6	.24	1.44
	6–12	.16	.96
	12–20	.17	1.36
	20–34	.18	2.52
	34–40+	.23	--------
Bangor silt loam, moderately deep (Garland)	0–8	.15	1.20
	8–14	.17	1.02
	14–20	.17	1.02
	20–24+	.15	--------
Buxton silt loam (Brewer)	0–8	.20	1.60
	8–13	.19	.95
	13–18	.16	.80
	18–25	.16	1.12
	25–42	.18	3.06
	42–48+	.19	--------
Colton loamy fine sand, dark materials. (Old Town)	0–10	.07	.70
	10–19	.08	.72
	19–26	.06	.42
	26–31	.03	.15
	31–37+	.08	--------
Dixmont silt loam (Corinna)	0–7	.20	1.40
	7–15	.19	1.52
	15–23	.17	1.36
	23–37	.09	1.26
	37–50+	.17	--------
Elmwood fine sandy loam (Bradley)	0–7	.28	1.96
	7–12	.29	1.45
	12–30	.18	3.24
	30–36+	.19	--------
Monarda silt loam (Corinna)	0–7	.32	2.24
	7–15	.22	1.76
	15–38	.22	5.06
Plaisted gravelly loam (Orono)	0–8	.12	.96
	8–14	.14	.84
	14–20	.16	.96
	20–26	.18	1.08
	26–32+	.23	--------
Plaisted gravelly loam (West Old Town)	0–9	.18	1.62
	9–14	.16	.80
	14–36	.17	3.74
	36–44+	.17	--------
Stetson fine sandy loam (Greenbush)	0–7	.20	1.40
	7–24	.19	3.23
	24–32	.01	.08

[1] Analyses by Eliot Epstein and W. J. Grant, Agricultural Research Service, U.S. Department of Agriculture, and Maine Agricultural Experiment Station, Orono, Maine.

TABLE 3.—*Available moisture capacity for selected soils* [1]—Continued

Soil and town in which located	Depth of horizon	Available moisture capacity	Available moisture capacity of horizon
	Inches	*Inches per inch of soil*	*Inches*
Suffield silt loam (Old Town)	0–7	0.30	2.10
	7–11	.31	1.24
	11–16	.35	1.75
	16–22+	.23	--------
Suffield very fine sandy loam (Old Town)	0–8	.23	1.84
	8–10	.34	.68
	10–20	.25	2.50
	20–26+	.23	--------

each horizon was obtained from the average density of three core samples. Large stones, which may appear in the field were not considered in calculating the available moisture capacity, which is expressed in inches of water per inch of soil.

The data shown in table 4, in the columns following the column headed "Depth from surface", indicate the physical properties of the modal soils for the various soils mapped. Where test data for the modal profiles are available, the data shown are based on these test data. If tests were not performed, the estimates shown are based on test data obtained from similar soils in this county or from the same soils in other counties and are also based on past experience in engineering construction. Since the estimates are only for the modal soils, considerable variation from these values should be anticipated. More information on the range of properties of the soils can be obtained in other sections of the report.

There is considerable variation in the texture (grain size) of glacial and water-deposited material. Hence, the engineering soil classifications in table 4 will not apply to all parts of a mapped soil unit. Furthermore, cobblestones and other stones larger than 3 inches are not considered when soils are given engineering classifications.

In table 4 permeability was estimated for the uncompacted soil. The estimates are based on soil structure, some laboratory measurements, and local experience. Some of the laboratory measurements used are those shown in table 3.

The available moisture capacity per inch of soil depth is an approximation of the capillary water in the soil when it is wet to field capacity. When the soil is air dry, this amount of water will wet the soil material described to a depth of 1 inch without deeper percolation.

Shrink-swell potential indicates the degree of volume change to be expected with a change in moisture content. It is estimated primarily on the basis of the amount and type of clay present. In general, soils classified as CH and A–7 have a high shrink-swell potential. Clean sands and gravels (single grain) and soils having small amounts of nonplastic to slightly plastic fines, as well as most other nonplastic to slightly plastic soil materials, have a low shrink-swell potential.

The soils are evaluated for some engineering uses in table 5. Specific features in the soil profile that may affect engineering work are pointed out. Information in this table is based on estimated data from table 4, actual test data available, and field experience in the performance of the soils. It provides a guide to potential hazards or soil characteristics that require special precaution in planning, design, or construction of engineering works.

Highway Work

The adaptability of soils to winter grading depends largely on the texture and natural water content of the soil material and on the depth to the water table during winter. Clay soils, when wet, are difficult to handle and must be dried to proper moisture content for compaction. Also, when clay soils are frozen, they may be difficult to excavate and should not be used in the compacted road section. Therefore, these soils are rated "poor." Fine sands and silts with a high water table during the freezing period are also rated "poor." In these soils extensive ice lenses can develop, and if the frozen material is placed in the compacted road section, differential settlement may occur in the embankments when the ice melts.

The rating of the soil for susceptibility to frost action depends on the texture of the soil material, the depth to the water table during the freezing period, and the length of time that the temperature is below freezing. Silts and fine sands with a high water table are rated "high."

Construction work is a problem on many of the soils, particularly those derived from glacial till. Such soils have numerous large stones and boulders and are shallow to bedrock. In some parts of the county, stones and boulders have been removed from the surface but occur in the subsoil and substratum. Thorndike, Canaan, and other soils that are shallow to bedrock require careful investigation when structures that require excavations are planned.

Frost action has also been considered in rating the soils as sources of sand and gravel. Generally soils are not susceptible to frost action if less than 10 percent of the soil material passes the No. 200 sieve. It may be necessary, however, to explore extensively to find materials that meet this requirement, even in soils rated as good sources of sand and gravel in table 5. In Penobscot County the Colton are probably the only soils that meet the requirement.

The ratings given the soils in table 5 as sources of topsoil for slopes of embankments, ditches, and cut slopes were developed for this county. Normally, only the material from the uppermost layer will be used, and the ratings apply only to nonstony or stone-cleared soils.

A perched water table occurs in some of the soils that have developed from glacial till. This is caused by a compact, platy layer, or fragipan, that has slow permeability. Seepage may occur along the top of this layer. If roads are to be constructed on such soils, a survey should be made to determine the need for underdrains. Some underdrains will be needed in road cuts. The requirements for underdrains should be determined by field exploration.

Seepage in back slopes of road cuts may cause the overlying material to slump or slide, especially in Dixmont, Howland, and Plaisted soils.

TABLE 4.—*Brief descriptions of soils*

Map symbol	Soil	Depth to seasonal high water table	Brief site and soil description
		Feet	
AaB AaC AaE	Adams loamy sand, 0 to 8 percent slopes. Adams loamy sand, 8 to 15 percent slopes. Adams loamy sand, 15 to 45 percent slopes.	More than 5	Glacial-outwash and wind deposits that are very dry and very deep and consist of particles that are generally uniform in size; mainly in the valley of the Penobscot River.
AgA AgB AgC AgD	Allagash fine sandy loam, 0 to 2 percent slopes. Allagash fine sandy loam, 2 to 8 percent slopes. Allagash fine sandy loam, 8 to 15 percent slopes. Allagash fine sandy loam, 15 to 25 percent slopes.	More than 5	Well-drained, very deep sandy soils over sand and gravel; occur as deposits of glacial outwash and on river terraces.
BaA BaB BaC BaD BnB BnC BnD	Bangor silt loam, 0 to 2 percent slopes.[3] Bangor silt loam, 2 to 8 percent slopes. Bangor silt loam, 8 to 15 percent slopes. Bangor silt loam, 15 to 25 percent slopes. Bangor very stony silt loam, 0 to 8 percent slopes. Bangor very stony silt loam, 8 to 15 percent slopes. Bangor very stony silt loam, 15 to 25 percent slopes.	More than 5	1 to 1½ feet of well-drained silty soil over 5 feet or more of well-drained, compact, silty glacial till from slate and shale; stones, a few boulders, and slaty fragments occur throughout the profile; till generally acid but in places is neutral or slightly calcareous at a depth of 12 to 20 feet. The stony type contains numerous large stones and boulders on the surface and throughout the profile.
BmB BmC BmD	Bangor silt loam, moderately deep, 2 to 8 percent slopes. Bangor silt loam, moderately deep, 8 to 15 percent slopes. Bangor silt loam, moderately deep, 15 to 35 percent slopes.	More than 5	1 to 2 feet of well-drained silty soil over thin, slaty glacial till and residuum from lime-seamed bedrock; a few stones and boulders.
BoA	Biddeford silt loam, 0 to 3 percent slopes.	(Water table at surface)	Very poorly drained silty soil underlain by very deep lacustrine and marine deposits of silt and clay; (surface deposits or organic matter not considered); occurs on nearly level or depressed areas.
BrA	Burnham silt loam, 0 to 3 percent slopes.	(Water table at surface)	1 to 2 feet of very poorly drained silty soil over very deep, slaty and shaly or mixed granitic and slaty, compact glacial till; (7 to 10 inches of highly organic material in surface not considered); usually on nearly level or depressed areas.
BuA BuB BuC	Buxton silt loam, 0 to 2 percent slopes. Buxton silt loam, 2 to 8 percent slopes. Buxton silt loam, 8 to 15 percent slopes.	1½ to 2	Moderately well to somewhat poorly drained silty soil underlain by very deep silt and clay deposits; on gently sloping or undulating and sloping marine and lacustrine terraces.
BxB	Buxton, Scantic, and Biddeford stony silt loams, 0 to 8 percent slopes.	½ to 2	See separate descriptions of Buxton, Scantic,
CaC CaE	Canaan extremely rocky sandy loam, 5 to 15 percent slopes. Canaan extremely rocky sandy loam, 15 to 45 percent slopes.	(None above bedrock)	10 to 16 inches of dry sandy soil from coarse, granitic glacial till on granitic bedrock; many large boulders and stones; in hilly and mountainous areas.
CcB CcC CcD CcE	Colton cobbly sandy loam, dark materials, 0 to 8 percent slopes. Colton cobbly sandy loam, dark materials, 8 to 15 percent slopes. Colton cobbly sandy loam, dark materials, 15 to 25 percent slopes. Colton cobbly sandy loam, dark materials, 25 to 45 percent slopes.	More than 5	Cobbly, sandy, and gravelly glacial-outwash deposits; usually very dry and very deep and unsorted; some pebbles may have calcite coatings at 10 to 12 feet.

See footnotes at end of table.

and their estimated physical properties

Depth from surface	Classification			Percent passing sieve—			Permeability [1]	Available moisture capacity	Shrink-swell potential
	USDA texture	Unified	AASHO	No. 4 (4.76 mm.)	No. 10 (2.0 mm.)	No. 200 (0.074 mm.)			
Inches								*Inches per inch of depth* [2]	
0 to 60	Loamy sand	SM	A-2-4	100	100	15–30	Very rapid	0.06 to 0.08	Moderate.
0 to 36	Fine sandy loam	SM	A-2	100	100	15–25	Moderate	0.10 to 0.18	Low.
36 to 60	Interstratified sand and gravel.	GM–SM	A-2	55–60	45–50	15–25	Very rapid	0.04	Low.
0 to 18	Loam or silt loam	ML	A-5(7)	94	82	66	Moderate	0.15 to 0.22	Moderate.
18 to 72	Gravelly silt loam	ML–CL	A-4(5)	84	73	61	Moderately slow.	0.15 to 0.22	Moderate.
72 to 131	Gravelly silt loam	ML–CL	A-4(5)	84	74	61	Moderately slow.	0.15 to 0.22	Moderate.
0 to 18	Silt loam	ML–CL	A-4	90	85	65	Moderate	0.13 to 0.17	Moderate.
18 to 34 (bedrock below 34 inches).	Shaly silt loam—lime seamed.	ML–CL	A-4	80	75	55	Moderate	0.13 to 0.17	Moderate.
10 to 40	Silty clay loam or silty clay.	ML–CL	A-6	100	100	95–99	Slow	0.17 to 0.19	Moderate.
7 to 24	Silt loam	ML	A-4	90–95	80–90	60–70	Moderate	0.17 to 0.19	Moderate.
24 to 48	Heavy silt loam or gritty loam.	ML–CL	A-4	85–90	85–95	65–75	Moderately slow.	0.15 to 0.22	Moderate.
0 to 20	Silt loam	ML–CL	A-4	100	100	90–95	Slow	0.17 to 0.19	Moderate.
20 to 40	Silty clay or silty clay loam.	ML–CL	A-6	100	100	95–99	Slow	0.21 to 0.25	Moderate.
and Biddeford soils.									
0 to 16	Sandy loam (bedrock).	SM	A-2-4	80–95	75–90	25–30	Rapid	0.11 to 0.13	Moderate.
0 to 16	Cobbly sandy loam or loamy sand.	GW–GM	A-1-a	55	45	10	Rapid	0.04	Low.
16 to 72	Cobblestones	GP	A-1	30	10	5	Rapid	0.04	Low.

TABLE 4.—*Brief descriptions of soils and*

Map symbol	Soil	Depth to seasonal high water table	Brief site and soil description
		Feet	
CnA	Colton gravelly sandy loam, dark materials, 0 to 2 percent slopes.	More than 5	Dry and very deep, sandy and gravelly glacial-outwash deposits that are usually sorted and stratified; calcite coatings on gravel at 10 to 12 feet.
CnB	Colton gravelly sandy loam, dark materials, 2 to 8 percent slopes.		
CnC	Colton gravelly sandy loam, dark materials, 8 to 15 percent slopes.		
CnD	Colton gravelly sandy loam, dark materials, 15 to 25 percent slopes.		
CnE	Colton gravelly sandy loam, dark materials, 25 to 45 percent slopes.		
CsA	Colton loamy fine sand, dark materials, 0 to 2 percent slopes.[3]	More than 5	Very dry and very deep loamy fine sand over sandy and gravelly glacial outwash that is usually sorted and stratified; a few cobblestones in lower part.
CsB	Colton loamy fine sand, dark materials, 2 to 8 percent slopes.		
CsC	Colton loamy fine sand, dark materials, 8 to 15 percent slopes.		
CsD	Colton loamy fine sand, dark materials, 15 to 25 percent slopes.		
DaA	Daigle silt loam, 0 to 2 percent slopes.	1 to 3	1 to 1½ feet of moderately well drained to somewhat poorly drained silty soil over 4 feet or more of compact silty clay loam glacial till from slate, shale, and limestone; a few stones and some slate and shale fragments throughout the profile; till generally acid but in places is neutral or calcareous at 10 to 12 feet. The stony type contains numerous large stones and boulders on the surface and throughout the profile.
DaB	Daigle silt loam, 2 to 8 percent slopes.		
DaC	Daigle silt loam, 8 to 15 percent slopes.		
DgA	Daigle stony silt loam, 0 to 2 percent slopes.		
DgB	Daigle stony silt loam, 2 to 8 percent slopes.		
DgC	Daigle stony silt loam, 8 to 15 percent slopes.		
DxA	Dixmont silt loam, 0 to 2 percent slopes.	1½ to 4	1 to 1½ feet of moderately well drained silt loam over 5 feet or more of somewhat poorly drained, compact silty glacial till from slate and shale; stones, a few boulders, and slaty fragments throughout the profile; till generally acid but in places neutral at 12 to 20 feet; wooded areas much stonier than cleared fields. The stony type contains numerous large stones and boulders on the surface and throughout the profile.
DxB	Dixmont silt loam, 2 to 8 percent slopes.		
DxC	Dixmont silt loam, 8 to 15 percent slopes.		
DyA	Dixmont very stony silt loam, 0 to 2 percent slopes.		
DyB	Dixmont very stony silt loam, 2 to 8 percent slopes.		
DyC	Dixmont very stony silt loam, 8 to 15 percent slopes.		
EwB	Elmwood fine sandy loam, 0 to 8 percent slopes.	1½ to 4	3 to 4 feet of moderately well drained fine sandy soil over marine and lacustrine silt and clay deposits; fine sandy lenses in places.
Ha	Hadley silt loam.	(Flooding usually in spring only.)	2 to 3 feet of well-drained fine sandy or silty soil over flood-plain materials of fine sand and some gravel; usually occurs on narrow bands along larger rivers and streams.
HbB	Hermon sandy loam, 2 to 8 percent slopes.	More than 6	1½ to 2 feet of dry sandy soil over loose, coarse-textured, granitic glacial till; is usually very deep and very acid and has many boulders and stones; on rolling and hilly upland. The stony type contains numerous large stones and boulders on the surface and throughout the profile.
HbC	Hermon sandy loam, 8 to 15 percent slopes.		
HeB	Hermon very stony sandy loam, 2 to 8 percent slopes.		
HeC	Hermon very stony sandy loam, 8 to 15 percent slopes.		
HeE	Hermon very stony sandy loam, 15 to 45 percent slopes.		
HhC	Hermon extremely stony sandy loam, 5 to 15 percent slopes.[4]		

See footnotes at end of table.

their estimated physical properties—Continued

Depth from surface	Classification			Percent passing sieve—			Permeability [1]	Available moisture capacity	Shrink-swell potential
	USDA texture	Unified	AASHO	No. 4 (4.76 mm.)	No. 10 (2.0 mm.)	No. 200 (0.074 mm.)			
Inches								*Inches per inch of depth* [2]	
0 to 30	Gravelly sandy loam	GW–GM	A–1–a	55	35	10	Rapid	0.06 to 0.09	Low.
30 to 46	Loamy sand	SP	A–1–b	60	50	5	Rapid	0.06 to 0.09	Low.
46 to 72	Gravel and cobblestones.	GP	A–1	35	15	5	Rapid	0.04	Low.
0 to 30	Loamy fine sand	SM	A–2	100	100	30	Rapid	0. 06 to 0. 09	Moderate.
30 to 46	Sandy gravel	GP	A–1	50	35	5	Rapid	0. 06 to 0. 09	Low.
46 to 72	Gravel	GP	A–1	35	15	5	Rapid	0. 04	Low.
0 to 18	Silt loam	GM–GC	A–4	60–65	55–60	35–45	Moderate	0. 15 to 0. 17	Moderate.
18 to 60	Silty clay loam or silty clay.	CL	A–4	80–90	75–85	55–60	Slow	0. 17 to 0. 21	Moderate.
0 to 18	Silt loam	ML-CL	A–4	90	85	65	Moderate	0. 15 to 0. 18	Moderate.
18 to 72	Heavy or gritty silt loam.	ML-CL	A–4	90	85	65	Slow	0. 13 to 0. 17	Moderate.
0 to 30	Fine sandy loam	SM	A–2–4	100	100	15–25	Rapid	0. 17 to 0. 22	Moderate.
30 to 60	Fine sandy clay or silty clay loam.	CL	A–6	100	100	90–95	Slow	0. 21 to 0. 26	Moderate.
0 to 36	Silt loam	ML–CL	A–4	90–95	65–80	55–65	Moderate	0. 13 to 0. 21	Moderate.
0 to 24	Sandy loam	SM	A–2–4	80–95	75–90	25–35	Moderately rapid.	0. 11 to 0. 13	Moderate.
24 to 72	Coarse sandy loam or loamy sand.	SP–SM	A–1–b	90–95	80–90	5–10	Rapid	0. 08 to 0. 10	Low.

TABLE 4.—*Brief descriptions of soils and*

Map symbol	Soil	Depth to seasonal high water table	Brief site and soil description
		Feet	
HdB HdC	Hermon sandy loam, moderately deep, 2 to 8 percent slopes. Hermon sandy loam, moderately deep, 8 to 15 percent slopes.	(None above bedrock)	1½ to 2 feet of well-drained sandy soil from coarse, granitic glacial till; granitic bedrock at 18 to 30 inches; scattered stones and boulders occur on rolling to hilly upland.
HoB HoC HvB HvC HvD	Howland gravelly loam, 0 to 8 percent slopes. Howland gravelly loam, 8 to 15 percent slopes. Howland very stony loam, 0 to 8 percent slopes. Howland very stony loam, 8 to 15 percent slopes. Howland very stony loam, 15 to 25 percent slopes.	1 to 3	1½ to 2 feet of moderately well drained loamy soil over compact, loamy glacial till from mixed granitic, slaty, and shaly materials; boulders, stones, and fragments of shale and slate in profile. The stony type contains numerous large stones and boulders on the surface and throughout the profile.
Lk	Limerick silt loam.	(Flooding common)	1 to 1½ feet of poorly drained silt loam over stratified and mixed flood-plain materials; includes sandy loam, gravelly loam, and streaks of sandy clay.
MaB	Machias fine sandy loam, 0 to 8 percent slopes.	1 to 4	1½ to 2 feet of moderately well drained fine sandy soil over glacial outwash consisting of stratified fine sand and gravel.
MbB	Madawaska very fine sandy loam, 0 to 8 percent slopes.	1 to 3	2 to 3 feet of moderately well drained to somewhat poorly drained very fine sandy or silty soil; overlies stratified sandy, fine sandy, and loamy river-terrace materials.
MeA MeB MeC	Melrose fine sandy loam, 0 to 2 percent slopes. Melrose fine sandy loam, 2 to 8 percent slopes. Melrose fine sandy loam, 8 to 15 percent slopes.	More than 5	3 to 4 feet of well-drained fine sandy soil over very deep marine and lacustrine silt and clay deposits.
Mn	Mixed alluvial land.	(Water table at surface)	Moderately well drained to somewhat poorly drained sandy, gravelly, and silty flood-plain materials on narrow bottom land; boulders and stones are included.
MoB	Monarda silt loam, 0 to 8 percent slopes.[3]	(Water table at surface)	1 to 1½ feet of poorly drained silty soil; overlies 5 feet or more of compact, silty glacial till from slate and shale, or loamy glacial till from mixed granite, slate, and shale; stones, boulders, and slaty fragments throughout the profile; till generally medium to slightly acid but in places neutral to calcareous at 10 to 12 feet; usually on nearly level or depressed areas.
MrB MsC	Monarda and Burnham very stony silt loams, 0 to 8 percent slopes. Monarda and Burnham extremely stony silt loams, 0 to 15 percent slopes.	(Water table at surface)	Material is frequently shallow to bedrock and extremely bouldery and stony in places; also occurs in mountainous areas. (See separate descriptions of Monarda and Burnham soils.)
Mu	Muck.	(Water table at surface)	Wet, very deep, decomposed organic matter
On	Ondawa fine sandy loam.	(Flooding usually in spring only.)	2 to 3 feet of well-drained fine sandy or silty soil over flood-plain materials of fine sand and some gravel; usually occurs on narrow bands along larger rivers and streams.
Pa Pc Pf Ps	Peat and muck. Peat, coarsely fibrous. Peat, moderately fibrous. Peat, sphagnum.	(Water table at surface)	Wet, very deep, highly organic materials that vary in depth. (On-site examinations are necessary.)

See footnotes at end of table.

their estimated physical properties—Continued

Depth from surface	Classification			Percent passing sieve—			Permeability [1]	Available moisture capacity	Shrink-swell potential
	USDA texture	Unified	AASHO	No. 4 (4.76 mm.)	No. 10 (2.0 mm.)	No. 200 (0.074 mm.)			
Inches								*Inches per inch of depth* [2]	
0 to 30 (bedrock below 30 inches.)	Sandy loam	SM	A-2-4	80-95	80-90	25-35	Rapid	0. 11 to 0. 13	Moderate.
0 to 18	Gravelly or gritty loam.	ML-CL	A-4	90-95	85-90	55-60	Moderate	0.13 to 0.17	Low to moderate.
18 to 48	Gravelly loam	ML-CL	A-4	90-95	85-95	55-60	Slow	0.13 to 0.15	Low to moderate.
0 to 16	Fine sandy loam	ML-CL	A-4	70-80	65-75	55-65	Moderate	0.13 to 0.17	Moderate.
16 to 30	Gravelly loam	GM-SM	A-2-4	50-70	40-50	25-30	Rapid	0.13 to 0.17	Moderate.
0 to 30	Fine sandy loam	GM-GC	A-4	65-75	50-60	35-45	Moderate	0.13 to 0.17	Low.
30 to 48	Gravelly sandy loam.	GM-GC	A-2-4	50-60	40-50	25-35	Very rapid	0. 04	Low.
0 to 36	Fine sandy loam or silt loam.	ML-CL	A-4	70-80	65-75	60-65	Moderate	0.17 to 0.22	Moderate.
0 to 32	Fine sandy loam	SM	A-2-4	80-95	70-85	20-30	Rapid	0.17 to 0.22	Moderate.
32 to 50	Silty clay loam or silty clay.	CL	A-6	100	100	80-95	Slow	0.21 to 0.26	Moderate.
Variable—because of variability of soil materials, no estimates are made.									
0 to 18	Silt loam	ML	A-4	85-90	80-90	55-60	Moderate	0. 15 to 0. 18	Moderate.
18 to 72	Heavy silt loam or gritty loam.	ML-CL	A-4	85 90	80-90	55-60	Slow	0. 15 to 0. 21	Moderate.
See separate descriptions of Monarda and Burnham soils.									
Not suitable for engineering purposes.									
0 to 36	Fine sandy loam	SM	A-4	100	100	40-50	Moderate	0. 13 to 0. 17	Moderate.
Not suitable for engineering purposes.									

TABLE 4.—*Brief descriptions of soils and*

Map symbol	Soil	Depth to seasonal high water table	Brief site and soil description
		Feet	
PhB PhC PmB PmC	Perham silt loam, 0 to 8 percent slopes. Perham silt loam, 8 to 15 percent slopes. Perham stony silt loam, 0 to 8 percent slopes. Perham stony silt loam, 8 to 15 percent slopes.	More than 5	1½ to 2 feet of silty soil over very deep, compact silty clay loam glacial till from slate, shale, and limestone that contains a high percentage of silt and clay in matrix; fragments of shale, slate, and limestone, as well as scattered stones and boulders, are throughout profile.
PgB PgC PgD PgE PrC PrE PxC	Plaisted gravelly loam, 2 to 8 percent slopes. Plaisted gravelly loam, 8 to 15 percent slopes. Plaisted gravelly loam, 15 to 25 percent slopes. Plaisted gravelly loam, 25 to 45 percent slopes. Plaisted very stony loam, 5 to 15 percent slopes. Plaisted very stony loam, 15 to 45 percent slopes. Plaisted extremely stony loam, 5 to 15 percent slopes.	More than 5	1 to 1½ feet of well-drained loamy soil over deep, compact, sandy loam glacial till from mixed granite, slate, and shale materials; boulders, stones, and fragments of shale and slate common in profile; mountainous and hilly areas are often very stony and extremely bouldery in places; till is generally acid. The stony types contain numerous large stones and boulders on the surface and throughout the profile.
Py	Podunk fine sandy loam.	(Occasional flooding)	Moderately well drained to somewhat poorly drained, deep fine sandy loam or silt loam over flood-plain materials of fine sandy clay, fine sand, and some gravel; flooded mostly in spring.
RdB RaB	Red Hook and Atherton fine sandy loams, 0 to 8 percent slopes. Red Hook and Atherton silt loams, 0 to 8 percent slopes.	(Water table at surface)	The poorly drained Red Hook and very poorly drained Atherton are fine sandy or silty soils on stratified sand and silt; clay varves in places; gravel streaks may underlie the finer soil at 18 to 22 inches; occurs as glacial outwash and river terraces. Atherton soils differ from Red Hook by having a black mucky surface.
Re	Riverwash.	Often flooded	Variable materials—no estimates made.
RkC RkD	Rockland, Canaan material, sloping. Rockland, Canaan material, strongly sloping.	(None above bedrock)	Very dry, extremely shallow sandy soil; granitic bedrock at 5 or 6 inches; occurs on mountainous and extremely rocky areas.
RmC RmD	Rockland, Thorndike material, sloping. Rockland, Thorndike material, strongly sloping.	(None above bedrock)	Very dry, extremely shallow silty soil; lime-seamed bedrock at 7 or 8 inches; occurs on mountainous and extremely rocky areas.
Ro	Rock outcrop.	(None above bedrock)	Very little or no soil material; mountainous areas; quarries in places.
Sa	Saco silt loam.	(Flooding common)	2 to 2½ feet of very poorly drained silty soil over flood-plain materials that are generally fine to medium textured.
ScB	Scantic silt loam, 0 to 8 percent slopes.[3]	(Water table surface)	1 to 2 feet of poorly drained silty soil over 5 feet or more of massive and hard silt and clay deposits.
SeA SeB SeC SeD	Stetson fine sandy loam, 0 to 2 percent slopes. Stetson fine sandy loam, 2 to 8 percent slopes. Stetson fine sandy loam, 8 to 15 percent slopes. Stetson fine sandy loam, 15 to 25 percent slopes.	Generally more than 10	2 to 2½ feet of fine sandy soil over well-drained, very deep stratified sand and gravel from glacial outwash; calcite coatings common on gravel in pits 12 to 20 feet deep.
SfC SfE	Stetson-Suffield complex, 0 to 15 percent slopes. Stetson-Suffield complex, 15 to 45 percent slopes.	More than 5	Well-drained, very deep mixtures of sandy and gravelly glacial outwash and silt and clay deposits.
ShD	Stony land, Hermon material, strongly sloping.	Generally greater than 6.	All on steep and mountainous slopes. (See
SpD	Stony land, Plaisted material, strongly sloping.	Generally greater than 4.	All on steep and mountainous slopes. (See

See footnotes at end of table.

their estimated physical properties—Continued

Depth from surface	Classification: USDA texture	Classification: Unified	Classification: AASHO	Percent passing sieve—: No. 4 (4.76 mm.)	No. 10 (2.0 mm.)	No. 200 (0.074 mm.)	Permeability [1]	Available moisture capacity	Shrink-swell potential
Inches								*Inches per inch of depth* [2]	
0 to 24	Silt loam	ML-CL	A-4	80-90	75-85	50-55	Moderate	0. 17 to 0. 18	Moderate.
24 to 60	Silty clay	ML-CL	A-4	80-90	75-85	50-55	Slow	0. 17 to 0. 21	Moderate.
0 to 18	Gravelly loam	GM	A-2	60-70	70-80	30-35	Moderate	0. 17 to 0. 18	Moderate.
18 to 48	Gravelly loam	GM	A-4	60-70	55-65	40-45	Slow	0. 15 to 0. 18	Moderate.
0 to 36	Fine sandy loam	ML-CL	A-4	75	60	60	Moderate	0. 13 to 0. 19	Moderate.
0 to 21	Fine sandy loam or silt loam.	ML-CL	A-4	70-80	65-75	55-60	Moderate	0. 13 to 0. 17	Moderate to low.
21 to 32	Fine sandy loam or silt loam.	ML-CL	A-4	70-80	65-75	55-60	Moderate	0. 13 to 0. 17	Moderate to low.
32 to 60	Fine sandy clay and gravel.	GM-GC	A-2	55-65	40-50	25-30	Rapid	0. 04	Moderate to low.
0 to 5 (bedrock below 5 inches.)	Sandy loam	Because of the shallow soil material, these mapping units should be considered as bedrock for practical purposes.							
0 to 8 (bedrock below 8 inches.)	Silt loam	Because of the shallow soil material, these mapping units should be considered as bedrock for practical purposes.							
(Bedrock exposed.)	No estimates made—little or no soil material.								
0 to 30	Silt loam	ML-CL	A-6	100	100	70-90	Slow	0. 17 to 0. 19	Moderate.
0 to 14	Silt loam	ML-CL	A-4	100	100	95	Slow	0. 17 to 0. 19	Moderate.
14 to 72	Silty clay loam or silty clay.	ML-CL	A-6	100	100	99	Slow	0. 21 to 0. 26	Moderate.
0 to 24	Fine sandy loam	SM	A-1-b	70-85	65-75	20-30	Moderate	0. 17 to 0. 19	Low.
24 to 120	Gravel	SW-SM	A-1-a	45-60	35-45	0-5	Very rapid	0. 04	Low.
0 to 20	Fine sandy loam or silt loam.	See separate descriptions of Stetson and Suffield soils.					Moderate	0. 17 to 0. 24	Moderate.
20 to 60	Interstratified fine gravel, silt, and clay.	See separate descriptions of Stetson and Suffield soils.					Moderate	0. 04 to 0. 25	Moderate.

Hermon soils for description of soil material.)

Plaisted soils for description of soil material.)

TABLE 4.—*Brief descriptions of soils and*

Map symbol	Soil	Depth to seasonal high water table	Brief site and soil description
		Feet	
SuA	Suffield silt loam, 0 to 2 percent slopes.	More than 5	1 to 1½ feet of well-drained silty soil over very deep marine and lacustrine silt and clay deposits; relief usually undulating to sloping or steep; very erodible.
SuB	Suffield silt loam, 2 to 8 percent slopes.		
SuC	Suffield silt loam, 8 to 15 percent slopes.		
SuC2	Suffield silt loam, 8 to 15 percent slopes, eroded.		
SuD	Suffield silt loam, 15 to 25 percent slopes.		
SuD2	Suffield silt loam, 15 to 25 percent slopes, eroded.		
SuE	Suffield silt loam, 25 to 45 percent slopes.		
SvA	Suffield very fine sandy loam, 0 to 2 percent slopes.	More than 5	½ to 1 foot of well-drained sandy soil over very deep marine and lacustrine silt and clay deposits.
SvB	Suffield very fine sandy loam, 2 to 8 percent slopes.		
SvC	Suffield very fine sandy loam, 8 to 15 percent slopes.		
SvD	Suffield very fine sandy loam, 15 to 25 percent slopes.		
ThB	Thorndike shaly silt loam, 2 to 8 percent slopes.[3]	(None above bedrock)	1 to 1½ feet of well-drained shaly and silty soil that is primarily residuum from lime-seamed slate or shale; scattered boulders but usually few stones. The stony type contains numerous large stones and boulders on the surface and throughout the profile.
ThC	Thorndike shaly silt loam, 8 to 15 percent slopes.		
ThD	Thorndike shaly silt loam, 15 to 25 percent slopes.		
ThE	Thorndike shaly silt loam, 25 to 45 percent slopes.		
TvB	Thorndike very stony silt loam, 2 to 8 percent slopes.		
TvC	Thorndike very stony silt loam, 8 to 15 percent slopes.		
TvD	Thorndike very stony silt loam, 15 to 35 percent slopes.		
TkE	Thorndike very rocky silt loam, 2 to 8 percent slopes.	(None above bedrock)	½ to 1 foot of dry shaly silt loam that is primarily residuum from lime-seamed slate, shale, or phyllite.
TkC	Thorndike very rocky silt loam, 8 to 15 percent slopes.		
Wn	Winooski silt loam.	(Occasional flooding)	Moderately well drained to somewhat poorly drained, deep fine sandy loam or silt loam over flood-plain materials of silt loam, fine sand, and some gravel; flooded mostly in spring.

[1] Rate at which moisture percolates, in inches per hour: Very slow—0 to 0.2; slow—0.20 to 0.63; moderate—0.63 to 2.0; rapid—2.0 to 6.3; very rapid—more than 6.3.
[2] To convert to inches per foot of depth, multiply by 12.

their estimated physical properties—Continued

Depth from surface	Classification			Percent passing sieve—			Permeability [1]	Available moisture capacity	Shrink-swell potential
	USDA texture	Unified	AASHO	No. 4 (4.76 mm.)	No. 10 (2.0 mm.)	No. 200 (0.074 mm.)			
Inches								*Inches per inch of depth* [2]	
0 to 10	Silt loam	ML-CL	A-4	100	100	90-95	Moderately slow.	0. 23 to 0. 25	Moderate.
10 to 48	Silty clay loam or silty clay.	ML-CL	A-6	100	100	90-100	Slow	0. 21 to 0. 25	Moderate.
0 to 12	Very fine sandy loam	SM	A-2-4	85-95	70-90	20-30	Moderate	0. 21 to 0. 24	Moderate.
12 to 48	Silt loam and silty clay loam.	ML-CL	A-6	100	100	90-100	Slow	0. 21 to 0. 25	Moderate.
0 to 16 (bedrock below 16 inches.)	Shaly silt loam—lime seamed.	GM, SM	A-1	60-65	45-55	15-20	Moderate	0.10 to 0.14	Low.
0 to 10 (bedrock below 10 inches.)	Rocky silt loam—lime seamed.	Because of the shallow soil material, this mapping unit should be considered as bedrock.							
0 to 36	Silt loam	ML-CL	A-4	90-95	85-90	55-60	Moderate	0.13 to 0.19	Moderate.

[3] Test data available for this soil; see table 2.
[4] Occurs in mountainous and hilly areas; huge boulders and granitic stones are common.

TABLE 5.—*Engineering*

[Made land and Peat and muck are omitted from this table because they are too variable to be

Soil name and map symbol	Adaptability to winter grading	Susceptibility to frost action	Suitability of soil material for—		Suitability as source of—	
			Road subgrade	Road fill	Topsoil	Sand and gravel
Adams loamy sand AaB, AaC, AaE	Fair	Low	Fair	Fair	Poor	Not suitable
Allagash fine sandy loam AgA, AgB, AgC, AgD	Good	Low	Fair; good below 36 inches.	Good	Fair	Good below 3 feet.
Bangor silt loam BaA, BaB, BaC, BaD	Fair	Moderate	Fair	Good	Fair to good	Not suitable
Bangor silt loam, moderately deep BmB, BmC, BmD	Fair	Moderate	Fair	Fair	Good	Not suitable
Bangor very stony silt loam BnB, BnC, BnD	Fair	Moderate	Fair	Good; numerous boulders.	Fair; some problems with surface stones.	Not suitable
Biddeford silt loam BoA	Poor	High	Poor	Poor	Poor	Not suitable
Burnham silt loam BrA	Poor	High	Fair	Fair when dry.	Poor	Not suitable
Buxton silt loam BuA, BuB, BuC	Poor	High	Poor	Poor	Fair	Not suitable
Buxton, Scantic, and Biddeford stony silt loams BxB	See Buxton, Scantic, and Biddeford soils in this table.					
Canaan extremely rocky sandy loam CaC, CaE	Fair	Low	Good	Fair	Not suitable	Not suitable
Colton cobbly sandy loam, dark materials CcB, CcC, CcD, CcE	Good	Low	Good	Good	Not suitable	Good
Colton gravelly sandy loam, dark materials CnA, CnB, CnC, CnD, CnE	Good	Low	Good	Good	Not suitable	Good
Colton loamy fine sand, dark materials CsA, CsB, CsC, CsD	Good	Low	Good	Good	Not suitable	Good
Daigle silt loam DaA, DaB, DaC	Fair	Moderate	Fair	Fair	Fair to unsuitable.	Not suitable
Daigle stony silt loam DgA, DgB, DgC	Fair	Moderate	Fair	Fair; numerous boulders.	Fair to unsuitable.	Not suitable

interpretations of the soils

discussed accurately; Rock outcrop is also omitted, since its engineering features are obvious]

Suitability for ponds		Soil features affecting engineering practices				
Reservoir	Embankment	Vertical alinement in highways	Agricultural drainage	Irrigation	Diversion terraces	Waterways
Poor; will not hold water without treatment.	Not suitable	Cut slopes will flow.	(Not applicable)	High intake rate; low water-holding capacity.	Highly permeable; rolling or hilly.	Highly permeable; rolling to hilly.
Poor; excessive seepage.	Poor; rapidly permeable.	No unfavorable features.	(Not applicable)	High intake rate; fair water-holding capacity.	Permeable; subject to erosion.	Subject to erosion.
Good	Good; stable when compacted.	Some seepage may occur.	Included seepage spots may require drainage.	Medium intake rate; good water-holding capacity.	Sloping and steep in places.	Subject to erosion.
Poor; seepage along bedrock.	Poor	May strike bedrock.	(Not applicable)	Moderately high intake rate; fair water-holding capacity.	Irregular contours; shallow; rolling and hilly slopes.	Bedrock may outcrop.
Good	Good; stable when compacted.	Some seepage spots may occur; numerous boulders.	Included seepage spots may require drainage.	Medium intake rate; good water-holding capacity.	Sloping and steep in places.	Subject to erosion.
Good; permanently high water table.	Fair when dry and compacted.	Permanently high water table; seepage in cut slopes.	Wet; natural outlets inadequate.	(Not applicable)	(Not applicable).	Continuous flow; high water table.
Good	Good when dry and well compacted.	High water table; seepage in cut slopes.	Wet; natural outlets inadequate.	(Not applicable)	(Not applicable).	Continuous flow; high water table.
Good	Good; fairly stable but may erode.	Seasonally high water table; seepage and sloughing.	Fine materials may fill tile.	Slow intake rate; medium water-holding capacity.	Erodible material.	Erodible, may wash before cover is established.
Poor; excessive seepage; soil too shallow.	Not suitable; soil too shallow.	Shallow to bedrock.	(Not applicable)	(Not applicable)	Shallow to bedrock.	Shallow to bedrock.
Poor; excessive seepage.	Poor; rapidly permeable.	No unfavorable features.	(Not applicable)	High intake rate; low water-holding capacity.	Rolling and hilly slopes; highly permeable.	Rolling and hilly slopes; highly permeable.
Poor; excessive seepage.	Poor; rapidly permeable.	No unfavorable features.	(Not applicable)	High intake rate; low water-holding capacity.	Rolling and hilly slopes; highly permeable.	Rolling and hilly slopes; highly permeable.
Poor; excessive seepage.	Poor; rapidly permeable.	No unfavorable features.	(Not applicable)	High intake rate; low water-holding capacity.	Rolling and hilly slopes; highly permeable.	Rolling and hilly slopes; highly permeable.
Good	Good; stable when compacted.	Seepage along top of firm layer; erosion along cut slopes.	Steep slopes and seepage spots.	Low intake rate; good water-holding capacity.	Compact layer may prolong seepage in wet spots.	Prolonged seepage from local wet areas; may erode before cover is established.
Good	Good; stable when compacted.	Seepage along top of firm layer; erosion along cut slopes; numerous boulders.	Steep slopes and seepage spots.	Low intake rate; good water-holding capacity.	Compact layer may prolong seepage in wet spots.	Prolonged seepage from local wet areas; may erode before cover is established.

TABLE 5.—*Engineering*

Soil name and map symbol	Adaptability to winter grading	Susceptibility to frost action	Suitability of soil material for—		Suitability as source of—	
			Road subgrade	Road fill	Topsoil	Sand and gravel
Dixmont silt loam DxA, DxB, DxC	Fair	Moderate	Fair	Fair	Fair to good	Not suitable
Dixmont very stony silt loam DyA, DyB, DyC	Fair	Moderate	Fair	Fair; numerous boulders.	Fair; some problems with surface stones.	Not suitable
Elmwood fine sandy loam EwB	Poor	High	Poor; below 2 to 3 feet.	Fair	Fair	Not suitable
Hadley silt loam Ha	Poor	Moderate	Fair	Fair	Good	Not suitable
Hermon sandy loam HbB, HbC	Good	Low	Good	Good	Poor to unsuitable.	Fair
Hermon sandy loam, moderately deep HdB, HdC	Fair	Low	Good	Fair	Fair	Not suitable
Hermon very stony sandy loam HeB, HeC, HeE	Good	Low	Good	Good; numerous boulders.	Not suitable	Fair
Hermon extremely stony sandy loam HhC	Good	Low	Good	Good	Not suitable	Fair
Howland gravelly loam HoB, HoC	Fair	High	Fair	Fair	Fair	Not suitable
Howland very stony loam HvB, HvC, HvD	Fair	High	Fair	Fair; numerous boulders.	Fair; some problems with surface stones.	Not suitable
Limerick silt loam Lk	Poor	High	Fair	Fair	Poor	Not suitable
Machias fine sandy loam MaB	Poor	Moderate	Fair	Good	Fair	Fair; limited by water table.
Madawaska very fine sandy loam MbB	Poor	High	Fair	Fair	Fair	Not suitable

interpretations of the soils—Continued

Suitability for ponds		Soil features affecting engineering practices				
Reservoir	Embankment	Vertical alinement in highways	Agricultural drainage	Irrigation	Diversion terraces	Waterways
Good	Good; stable when compacted.	Seepage along top of firm layer; erosion along cut slopes.	Steep slopes and seepage spots.	Low intake rate; good water-holding capacity.	Compact layer may prolong seepage in wet spots.	Prolonged seepage from local wet areas; may erode before cover is established.
Good	Good; stable when compacted.	Seepage along top of firm layer; erosion along cut slopes; numerous boulders.	Steep slopes and seepage spots.	(Not applicable)	Compact layer may prolong seepage in wet spots.	Prolonged seepage from local wet areas; may erode before cover is established.
Good; but lenses occur in places.	Fair	Slow internal water movement; seepage from sand lenses in cut slopes.	Subject to seepage.	Moderately high intake rate; good water-holding capacity.	Seepage and sand lenses.	Prolonged seepage in places.
Poor; subject to flooding.	Fair to poor	Subject to periodic flooding.	(Not applicable)	Moderate intake rate; good water-holding capacity.	(Not applicable)	Subject to periodic flooding.
Poor; will not hold water without treatment.	Poor; rapidly permeable but adequate strength and stability.	No unfavorable features.	(Not applicable)	Moderately high intake rate; fair water-holding capacity.	Rolling and hilly	Rolling and hilly.
Poor; soil too shallow.	Not suitable; soil too shallow.	May strike bedrock.	(Not applicable)	High intake rate; medium to low water-holding capacity.	Irregular slopes	Irregular slopes.
Poor; will not hold water without treatment.	Poor; rapidly permeable but adequate strength and stability.	Numerous boulders.	(Not applicable)	(Not applicable)	Rolling to steep	Rolling to steep.
Poor; will not hold water without treatment.	Poor; rapidly permeable but adequate strength and stability.	Numerous boulders.	(Not applicable)	(Not applicable)	Rolling to steep	Rolling to steep.
Good	Good	Seepage along top of compact layer; cut slopes erodible.	Occurs on steep slopes; erodible.	Low intake rate; good water-holding capacity.	Prolonged seepage.	Prolonged seepage; erodible; may wash before cover is established.
Good	Good	Seepage along top of compact layer; cut slopes erodible; numerous boulders.	Occurs on steep slopes; erodible.	(Not applicable)	Prolonged seepage.	Prolonged seepage; erodible; may wash before cover is established.
Poor; subject to flooding.	Fair when dry and compacted.	High water table; subject to flooding.	Inadequate natural outlets.	(Not applicable)	(Not applicable)	Continuous flow; high water table.
Poor; moderately permeable sand and gravel layers and seepage in places.	Fair; may be used if well compacted and mixed.	Seepage on cut slopes.	Sand and gravel lenses; cut slopes subject to seepage and sloughing.	Moderately low intake rate and good water-holding capacity.	Seepage in places.	Seepage in places.
Poor; sand substratum may cause leakage.	Fair; may be used if well compacted and mixed.	Subject to seepage and erosion on cut slopes.	Sand and gravel lenses; cut slopes subject to seepage and sloughing.	Moderately low intake rate and good water-holding capacity.	Seepage in places.	Seepage in places.

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TABLE 5.—*Engineering*

Soil name and map symbol	Adaptability to winter grading	Susceptibility to frost action	Suitability of soil material for—		Suitability as source of—	
			Road subgrade	Road fill	Topsoil	Sand and gravel
Melrose fine sandy loam MeA, MeB, MeC	Fair	Moderate	Fair above 3 to 4 feet; poor below.	Good above 3 to 4 feet; poor below.	Good	Not suitable
Mixed alluvial land Mn	Poor	High	Poor to fair.	Fair	Poor	Not suitable
Monarda silt loam MoB	Poor	High	Fair	Fair	Fair	Not suitable
Monarda and Burnham very stony silt loams. MrB	Poor	High	Fair	Fair; numerous boulders.	Not suitable	Not suitable
Monarda and Burnham extremely stony silt loams. MsC	Poor	High	Fair	Fair; numerous boulders.	Not suitable	Not suitable
Ondawa fine sandy loam On	Poor	Moderate	Fair	Fair	Good	Not suitable
Perham silt loam PhB, PhC	Fair	Moderate	Fair	Fair	Fair	Not suitable
Perham stony silt loam PmB, PmC	Fair	Moderate	Fair	Fair	Fair	Not suitable
Plaisted gravelly loam PgB, PgC, PgD, PgE	Fair	Moderate	Fair	Fair	Fair	Not suitable
Plaisted very stony loam PrC, PrE	Fair	Moderate	Fair	Fair; numerous boulders.	Fair; some problems with surface stones.	Not suitable
Plaisted extremely stony loam PxC	Fair	Moderate	Fair	Fair; numerous boulders.	Not suitable	Not suitable
Podunk fine sandy loam Py	Poor	High	Fair	Fair	Good	Not suitable

interpretations of the soils—Continued

Suitability for ponds		Soil features affecting engineering practices				
Reservoir	Embankment	Vertical alinement in highways	Agricultural drainage	Irrigation	Diversion terraces	Waterways
Fair; surface soil permeable; subsoil slowly permeable.	Fair when mixed.	Subject to seepage, erosion, and sloughing on cut slopes.	(Not applicable)	Moderately high intake rate; moderate water-holding capacity.	Loose surface; slowly permeable layer at a depth of 30 to 40 inches.	Seepage between sand and clay.
Poor; high water table and flooding.	Fair when mixed.	High water table most of year; subject to flooding.	High water table; flooding.	(Not applicable)	(Not applicable)	High water table.
Good; slowly permeable; high water table.	Suitable if well compacted and dry.	Seepage along top of slowly permeable compact layer; high water table.	High water table; slow internal water movement.	(Not applicable)	(Not applicable)	Subject to prolonged seepage; high water table.
Good; slowly permeable; high water table.	Suitable if well compacted and dry.	Seepage along top of compact layer; slowly permeable; high water table; numerous boulders.	High water table; slow internal water movement.	(Not applicable)	(Not applicable)	Subject to prolonged seepage; high water table.
Good; slowly permeable; high water table.	Suitable if well compacted and dry.	Seepage along top of compact layer; slowly permeable; high water table; numerous boulders.	High water table; slow internal water movement.	(Not applicable)	(Not applicable)	Subject to prolonged seepage; high water table.
Poor; subject to flooding.	Fair to poor	Subject to periodic flooding.	(Not applicable)	Moderate intake rate; good water-holding capacity.	(Not applicable)	Subject to periodic flooding.
Good	Good if compacted.	Seepage on cut slopes.	(Not applicable)	Moderately slow intake rate; good water-holding capacity.	Compact layer	Compact layer; subject to erosion.
Good	Good if compacted.	Seepage on cut slopes.	(Not applicable)	Moderately slow intake rate; good water-holding capacity.	Compact layer	Compact layer; subject to erosion.
Fair; below 50 inches material may be coarse textured and permeable in places.	Good; stable when compacted.	Seepage on cut slopes.	(Not applicable)	Moderate intake rate; good water-holding capacity.	Undulating and rolling slopes; compact layer.	Compact layer; subject to erosion.
Fair; below 50 inches material may be coarse textured and permeable in places.	Good; stable when compacted.	Seepage on cut slopes; numerous boulders.	(Not applicable)	(Not applicable)	Compact layer	Subject to erosion; compact layer.
Fair; below 50 inches material may be coarse textured and permeable in places.	Good; stable when compacted.	Seepage on cut slopes; numerous boulders.	(Not applicable)	(Not applicable)	Compact layer	Subject to erosion; compact layer.
Poor, subject to flooding.	Fair if well compacted and dry.	Subject to periodic flooding.	High water table	Moderate intake rate; good water-holding capacity	(Not applicable)	Spring flooding may cause washout.

TABLE 5.—*Engineering*

Soil name and map symbol	Adaptability to winter grading	Susceptibility to frost action	Suitability of soil material for—		Suitability as source of—	
			Road subgrade	Road fill	Topsoil	Sand and gravel
Red Hook and Atherton fine sandy loams RdB	Poor	High	Fair	Fair	Fair	Poor; limited by high water table.
Red Hook and Atherton silt loams RaB	Poor	High	Fair	Fair	Fair	Poor; limited by high water table.
Riverwash Re	Too variable to rate.					
Rockland, Canaan material RkC, RkD	Because of the shallow soil material, this mapping unit should be considered as bedrock					
Rockland, Thorndike material RmC, RmD	Same.					
Saco silt loam Sa	Poor	High	Poor	Poor	Not suitable	Not suitable
Scantic silt loam ScB	Poor	High	Poor	Poor	Poor	Not suitable
Stetson fine sandy loam SeA, SeB, SeC, SeD	Good	Low	Good	Good	Fair	Good
Stetson-Suffield complex SfC, SfE	See Stetson soils and Suffield soils.					
Stony land, Hermon material ShD	Good	Low	Good	Good	Not suitable	Fair
Stony land, Plaisted material SpD	Fair	Moderate	Fair	Fair	Not suitable	Not suitable
Suffield silt loam SuA, SuB, SuC, SuC2, SuD, SuD2, SuE	Fair	Moderate	Poor	Poor	Good	Not suitable
Suffield very fine sandy loam SvA, SvB, SvC, SvD	Fair	Moderate	Poor	Poor	Good	Not suitable
Thorndike shaly silt loam ThB, ThC, ThD, ThE	Fair	Low	Fair	Fair	Not suitable	Not suitable
Thorndike very rocky silt loam TkB, TkC	Fair	Low	Fair	Fair between outcrops.	Not suitable	Not suitable
Thorndike very stony silt loam TvB, TvC, TvD	Fair	Low	Fair	Fair; numerous boulders.	Not suitable	Not suitable
Winooski silt loam Wn.	Poor	High	Fair	Fair	Good	Not suitable

interpretations of the soils—Continued

Suitability for ponds		Soil features affecting engineering practices				
Reservoir	Embankment	Vertical alinement in highways	Agricultural drainage	Irrigation	Diversion terraces	Waterways
Fair; high water table and sand lenses.	Fair	High water table; subject to sloughing and seepage on cut slopes.	Unstable cut banks; high water table.	(Not applicable)	Seepage	Continuous flow from high water table.
Fair; high water table and sand lenses.	Fair	High water table; sloughing and seepage.	Unstable cut banks; high water table.	(Not applicable)	Seepage	Continuous flow from high water table.
for practical purposes.						
Poor; high water table and flooding.	Poor	Frequent flooding.	Frequent flooding; inadequate outlets.	(Not applicable)	(Not applicable)	Permanent high water table; continuous flow.
Good	Fair	High water table; seepage and sloughing.	High water table; fine materials may fill tile.	(Not applicable)	(Not applicable)	High water table; erodible.
Poor; excessive seepage.	Poor; rapidly permeable.	No unfavorable features.	(Not applicable)	Moderately high intake rate; fair water-holding capacity.	Loose substrata	Subject to erosion; loose substrata.
Poor; will not hold water without treatment.	Poor; rapidly permeable but adequate strength and stability.	Numerous boulders.	(Not applicable)	(Not applicable)	Rolling to steep	Rolling to steep.
Poor; below 50 inches the material may be coarse textured and permeable in places.	Good; stable when compacted.	Numerous boulders; seepage on cut slopes.	(Not applicable)	(Not applicable)	Compact layer	Subject to erosion; compact layer.
Good; slowly permeable.	Good; fairly stable when compacted; cut slopes erodible.	Cut slopes erodible; sloughing.	(Not applicable)	Slow intake rate; water-holding capacity good.	Undulating, rolling, hilly, and steep slopes; erodible.	Erodible.
Good; slowly permeable.	Good; fairly stable when compacted; cut slopes erodible.	Cut slopes erodible; sloughing.	(Not applicable)	Slow intake rate; water-holding capacity good.	Undulating and rolling slopes; erodible.	Erodible.
Poor; excessive seepage; soil too shallow.	Not suitable; inadequate strength and stability.	Shallow to bedrock.	(Not applicable)	(Not applicable)	Shallow to bedrock.	Shallow to bedrock.
Poor; excessive seepage; soil too shallow.	Not suitable; soil too shallow.	Shallow to bedrock.	(Not applicable)	(Not applicable)	Shallow to bedrock.	Shallow to bedrock.
Poor; excessive seepage; soil too shallow.	Not suitable; inadequate strength and stability.	Shallow to bedrock; numerous boulders.	(Not applicable)	(Not applicable)	Shallow to bedrock.	Shallow to bedrock.
Poor; subject to flooding; periodic high water table.	Fair if well compacted and dry.	Subject to periodic flooding; periodic high water table.	Periodic high water table.	Moderate intake rate; good water-holding capacity.	(Not applicable)	Subject to flooding.

If the perched water table is at little depth below the pavement, differential volume change may occur, particularly within the depth of freezing. The decrease in bearing capacity of saturated foundation material that occurs on thawing may cause the pavement to break. Pockets of wet, fine-grained soil material should be removed and replaced by coarser grained material.

Some of the glacial till in the county consists of fine sand and silt that is susceptible to frost heave. Where such material occurs, a sufficient thickness of free-draining material should be used in the highway subgrade to prevent detrimental heaving of the pavement. Where pockets of fine-grained material occur in the coarse-grained material, differential frost heave can be prevented by mixing these materials. Heaving will then be uniform. Differential heaving can be prevented in such places by using a sufficient thickness of very permeable sandy gravel or coarse sand in the upper part of the subgrade.

Bedrock may be exposed in very deep cuts in deep glacial till. In shallow glacial till, the gradeline should be high enough to keep excavation of bedrock at a minimum and to avoid the seepage that occurs at the point where the till and bedrock meet. Systems that furnish adequate surface drainage and underdrainage should be provided, and coarse-grained soil materials should be used in the upper part of the subgrade.

Silt and clay deposits do not make good foundations because they are fine textured and have a water table that is frequently near the surface. Roads should be built on embankments over such soils. It may not be practical to use embankments, however, especially if good material is not available. If wet, fine-textured soil material is used in subgrades or embankments, the moisture content must be reduced to only slightly above optimum. Otherwise, adequate compaction cannot be obtained. The gradeline should be kept above the ground water table.

Muck and peat are not suitable for use as foundations for roads or other engineering structures because of the low strength of the material and the normally high water table. They are also subject to extensive subsidence and shrinkage when drained. Roads should be alined so as to avoid deep muck or peat. Muck and peat soils within a cut section of a roadway and at embankment sites should be wasted, or removed, and replaced by suitable soil materials. Some areas of muck, especially in potholes and at sites of old beaver dams, may be too small to be shown on the map. Road sites need to be checked for such areas.

Construction of roads on river terraces ordinarily involves a minimum of earthwork, except where the road ascends onto a high terrace or into the uplands. The gradeline should be kept above the level of the highest flooding on terraces and on flood plains.

Gravelly soils, if properly compacted, form good subgrades for roads. A rather extensive system of gravelly eskers crosses Penobscot County and would provide natural roadways and good sources of material. Underdrains may be needed where silt and clay deposits underlie the eskers or are mixed with their coarser grained materials and where the road cuts deep enough to reach the fine-textured materials. Road construction in glacial outwash generally requires somewhat less earthwork than in other deposits.

The suitability of the soil material for road fill depends largely on the texture of the soil material and its natural water content. Highly plastic soil materials are rated "poor" or "fair" for road fill, depending on their natural water content, their capacity to become dry and compact, and the facility with which they can be handled. Highly erodible soils are difficult to compact and require moderately gentle slopes and fast-growing vegetation; they are, therefore, rated "fair" for road fill.

All topsoil that contains a detrimental amount of organic matter should be removed from material used in embankments that are 5 feet or more high. All mucky surface layers should be removed from the roadway section and wasted or placed on embankment slopes.

Soil and Water Conservation Engineering

The principal engineering practices used in this county to conserve soil and water are agricultural drainage, irrigation, and the construction of farm ponds, diversion terraces, and waterways. Features affecting these practices are listed in table 5 for all the soils of the county. Some of the features are briefly discussed in this section.

The Dixmont and Plaisted soils have formed on glacial till and are underlain by a compact, platy layer that retards the movement of water. Seepage usually occurs along the top of this compact layer and causes wet spots. Both diversion and subsurface drains may be required to intercept the water. Careful investigation is necessary in planning irrigation systems in the Dixmont and Plaisted soils and in soils, such as the Thorndike, that are shallow to bedrock. This is because the limited depth of tillable soil lessens the amount of water available for crop use.

The Dixmont soils, formed from glacial till, have a slowly permeable subsoil or substratum and are suitable for sites for farm ponds. However, excess seepage from the reservoir may occur in Hermon sandy loam which formed from loose, coarse-textured materials. This sandy soil may also cause piping and unstable conditions in drainage structures.

The soils on glacial outwash, such as Colton, and soils of the flood plains, such as Ondawa, as a rule are composed of larger particles than the Dixmont soils derived from glacial till and are more permeable. Farm ponds constructed in these soils for storing water above ground may need a sealing agent to prevent seepage from the reservoir. Ponds for storing water below the natural ground surface, however, have been successful in soils, such as the Red Hook and Atherton, that have a water table close to the surface. Care is needed when installing open ditches or subsurface drains in the Red Hook or Atherton soils where there are layers of ungraded silt, fine sand, or sand. Such layers are subject to erosion, sloughing, and slumping. Subsurface drainage systems installed in these layers must be protected against plugging by silts and fine sands. Soils from coarse glacial outwash, such as the Colton, are normally droughty and have a low water-holding capacity. This fact should also be considered when planning an irrigation system for such soils.

Use of Soils for Woodland [3]

About 85 percent of Penobscot County is in forest. About 15 percent is in farms and much of this is in woodlots (fig. 6).

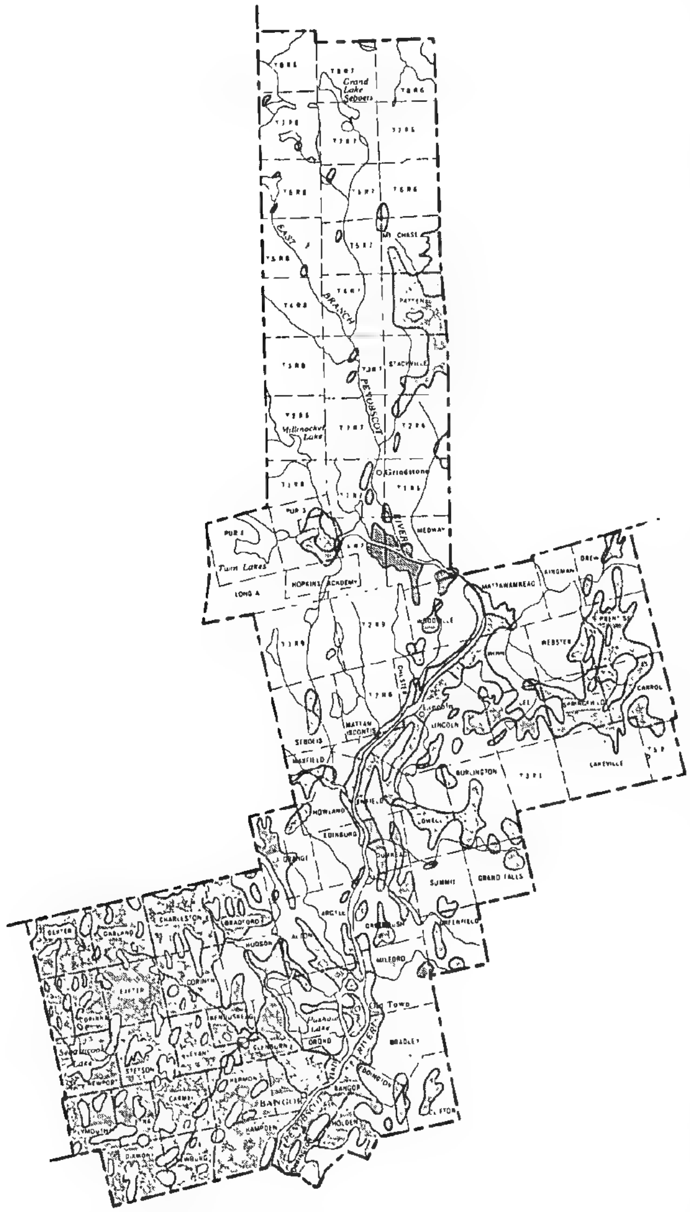

Figure 6.—**Distribution of land in Penobscot County: The unshaded areas are mostly wooded or mountainous, or both; the shaded areas are mostly on farms or farm woodlots.**

Much of the farm income has been and is now from woodlots, and much of the county income will be from forest products for a long time. The extensive holdings of the large paper companies in northern Penobscot County assure the use of large areas for pulpwood production.

Most of the original forest has been cut at least twice, and some areas have been repeatedly cut and burned. Except possibly for a few acres, no virgin timber exists in this county. All woodland practices, therefore, are concerned with second-growth stands. A large part of the cutting of these stands will be primarily for pulpwood. Stands suitable for sawtimber are of secondary importance.

The first lumber cut in Penobscot County was from magnificent white pine, 60 to 100 feet tall and straight as an arrow. The early woodcutters cut these trees and took the butt log only—anything that would not make a cant less than 18 inches square was left to rot. At first the timber nearest the Penobscot River was cut and driven to the mills in the annual spring log drives. Many splash dams were constructed on the Penobscot River and its tributaries to facilitate the spring runs. The lumber was mostly used for shipmasts and shipbuilding and for the construction of homes.

Next spruce and hemlock were extensively cut—the hemlock for bark for the tanning industry. Cutting of hemlock was so complete that even today there is none on many soils naturally well suited to it. After the pine, spruce, and hemlock were cut, cedar was cut for shingles; white birch for spool stock and toothpicks; ash, hard maple, and oak for implements, furniture, and carriages or wagons. The softwoods were first cut along the rivers and streams where they could be floated to the mills; and then both hardwoods and softwoods were cut from the hills and highlands and removed by tote road (skid road). These roads were used mainly during the winter months when the loggers could drag their logs out on the snow with yokes of oxen. Later steam log-haulers were used for the same purpose.

In about 1890, papermaking was started in the county. Several firms making pulp and paper were established in Brewer, Lincoln, and other places by 1900. Trees of small diameter were cut for pulpwood, and as a result the forest land was extensively stripped of all trees.

The size of the forest areas owned is variable. It ranges from the small acreages in farm woodlots in the south to the larger acreages in commercially owned tracts in the north. Except on the spruce-fir flats, no consistent management program based on the soils and trees has been developed. The spruce-fir flats, generally on the poorly drained and very poorly drained soils, have had some management. In these areas short cutting cycles have been used for pulpwood. Rate of growth for pulpwood has been studied, and cuttings 10 to 15 years apart are made by some companies.

The Maine Forest Service has a number of foresters who help farmers in woodlot management. The county has a good fire-control system. Many fire warden's camps and towers guard critical areas. Telephone lines are maintained, and radio communication is extensively used. Float planes are used to spot fires and transport tower operators and supplies. Boats, motors, canoes, supplies, and fire-fighting equipment are cached in strategically located areas.

Woodland Suitability Groups

The long-term management of forests must be based on a study of forest soils and the response of trees to them.

[3] Allan R. Gray, woodland conservationist, Soil Conservation Service, helped prepare this section.

TABLE 6.—*Woodland suitability*

Groups	Map symbols	Estimated suitability for production of—			Seeding mortality		
		White pine	Red spruce	Northern hardwoods	White pine	Red spruce	Northern hardwoods
Group 1: Deep, well-drained and moderately well drained, stone-free loamy soils.	BuA, BuB, BuC, SvA, SvB, SvC, SvD, SuA, SuB, SuC, SuC2, SuD, SuD2, SuE.	Good to very good.	Good	Good	Slight	Slight	Slight
Group 2: Deep, well-drained loamy soils.	AgA, AgB, AgC, AgD, BaA, BaB, BaC, BaD, BnB, BnC, BnD, Ha, HbB, HbC, HeB, HeC, HeE, CnA, CnB, CnC, CnD, CnE, MeA, MeB, MeC, On, PhB, PhC, PmB, PmC, PgB, PgC, PgD, PgE, PrC, PrE, SeA, SeB, SeC, SeD, SfC, SfE.	Good	Good	Good	Slight	Slight	Slight
Group 2a: Deep, well-drained loamy and extremely stony soils and stony land.	HhC, PxC, ShD, SpD	Good	Good	Good	Slight	Slight	Slight
Group 3: Deep, moderately well drained loamy soils.	DaA, DaB, DaC, DgA, DgB, DgC, DxA, DxB, DxC, DyA, DyB, DyC, EwB, HoB, HoC, HvB, HvC, HvD, MaB, MbB, Py, Wn.	Very good.	Very good.	Good	Slight	Slight	Slight
Group 4: Shallow to moderately deep, well-drained loamy soils.	BmB, BmC, BmD, ThB, ThC, ThD, ThE, TvB, TvC, TvD, HdB, HdC.	Good	Good	Good	Moderate	Moderate	Moderate
Group 5: Deep, poorly drained loamy soils.	BxB, RaB, RdB, Lk, ScB, MoB, MrB, MsC.	Good	Fair	Poor	Severe	Severe	Severe
Group 6: Deep, excessively and somewhat excessively drained, mostly coarse-textured soils.	AaB, AaC, AaE, CcB, CcC, CcD, CcE, CsA, CsB, CsC, CsD.	Good	Fair	Fair	Severe	Severe	Severe
Group 7: Very shallow, excessively drained rocky soils.	CaC, CaE, RkC, RmC, TkB, TkC.	Poor	Poor	Poor	Severe	Severe	Severe
Group 8: Deep, very poorly drained soils.	BoA, BrA, Mn, Sa	Poor	Poor	Poor	Severe	Severe	Severe
Group 9: Extremely wet and rocky land or made land.	Md, Mu, Pa, Pc, Pf, Ps, Re, RkD, RmD, Ro.	These soils not rated because they do not produce commercial wood.					

To this end the soils of the county have been placed in 10 woodland suitability groups as shown in table. 6. The soils in each group are listed at the end of this section. These suitability groups are based primarily on those characteristics of the soils that determine their productivity for selected species of trees—white pine, red spruce, and northern hardwoods. The productivity ratings shown in the table are estimates based on data collected in Maine and New Hampshire for similar soils.

Each group is also rated according to equipment limitations, seeding mortality, windthrow hazard, and source of road materials. Equipment limitations are determined by the soil characteristics and topographic features that restrict or prohibit the use of equipment commonly used in crop tending or tree harvesting. Knowledge of these factors may show the need for different kinds of equipment, methods of operation, or seasons of use. Seedling mortality refers to the expected degree of mortality of natural seedlings of the selected species in the different suitability groups, provided the seed supply is adequate. Windthrow hazard is determined by the soil characteristics that control development of firm tree roots that withstand windthrow (fig. 7). Suitability as a source of road material refers to the suitability of the soil for surfacing material for woods roads.

The effects on tree growth of aspect, position on slope, elevation, insects, and disease were not rated in the woodland suitability table. Sufficient information concerning

groupings of soils

Windthrow hazard			Equipment limitations	Suitable as a source of road material	Remarks
White pine	Red spruce	Northern hardwoods			
Moderate	Moderate	Moderate	Moderate	Poor	
Slight	Moderate	Slight	Slight	Fair	Allagash, Bangor, Perham, and Plaisted soils rate very good for white pine; the Colton, Hadley, and Ondawa soils rate fair for red spruce; the windthrow hazard is moderate for red spruce, as this tree is shallow rooted; suitability as a source of road material is good for Hermon, Colton, and Plaisted soils.
Slight	Moderate	Slight	Severe	Fair	Equipment limitations are severe and suitability as a source of road materials only fair on the soils of this group, unless boulders can be removed; some areas can be worked in winter when there is a snow cover; Plaisted soils rate very good for white pine.
Slight	Moderate	Slight	Moderate	Fair	Elmwood, Hermon, and Podunk soils rate good for white pine; Hermon soils rate good for red spruce; Dixmont soils rate very good for northern hardwoods.
Moderate	Moderate	Moderate	Moderate	Fair	
Severe	Severe	Severe	Severe	Fair	The soils in this group are the most common soils in spruce-fir flats.
Moderate	Moderate	Moderate	Slight	Fair to good	Steep (D and E) slopes on these soils are subject to sideslipping when heavy equipment is used.
Severe	Severe	Severe	Moderate	Poor	The soil mantle is rarely more than 10 inches and usually about 6 inches to bedrock; the laminated bedrock of the Thorndike soils lessens the windthrow hazard, since trees can extend roots into bedrock.
Severe	Severe	Severe	Severe	Poor	The soils of this group are common in marshes and poor spruce-fir flats.

these items is not available for specific kinds of soil in Penobscot County.

Except where roads are constructed on steep slopes, erosion hazard in the woodland areas of the county is relatively slight. This hazard was considered in the rating for equipment limitations.

Stoniness was also considered in making the ratings in table 6, particularly as it affects tree growth or logging operations. Extreme stoniness—numerous stones and boulders of large diameters—may cause severe difficulties in logging operations except during winter when snow is deep. This is a problem on Stony land, Hermon material, and Stony land, Plaisted material.

The slope of the soil, although not considered in the woodland suitability grouping, is particularly important in logging operation and roadbuilding. On slopes of less than 15 percent, neither farmers nor large commercial firms will have much difficulty in logging operations or roadbuilding. On slopes of 15 to 25 percent, the large commercial firms will have few problems, but farmers will find some difficulties. On slopes of 25 to 45 percent, logging operations, roadbuilding, and road maintenance are serious problems.

The data in table 6 are based in part upon studies made in several experimental forests in Penobscot County. The Northeastern Forest Experiment Station of the U.S. Forest Service conducts forest management studies on the Penobscot Experimental Forest in Bradley and Edding-

Figure 7.—**Spruce-fir flats, showing cradle knolls caused by blown-down trees.**

ton. The Maine Forest Service has a nursery at Olamon, and the University of Maine has an experimental forest at Stillwater.

The soils in each suitability group shown in table 6 are as follows:

Group 1:

Buxton silt loam, 0 to 2 percent slopes.
Buxton silt loam, 2 to 8 percent slopes.
Buxton silt loam, 8 to 15 percent slopes.
Suffield very fine sandy loam, 0 to 2 percent slopes.
Suffield very fine sandy loam, 2 to 8 percent slopes.
Suffield very fine sandy loam, 8 to 15 percent slopes.
Suffield very fine sandy loam, 15 to 25 percent slopes.
Suffield silt loam, 0 to 2 percent slopes.
Suffield silt loam, 2 to 8 percent slopes.
Suffield silt loam, 8 to 15 percent slopes.
Suffield silt loam, 8 to 15 percent slopes, eroded.
Suffield silt loam, 15 to 25 percent slopes.
Suffield silt loam, 15 to 25 percent slopes, eroded.
Suffield silt loam, 25 to 45 percent slopes.

Group 2:

Allagash fine sandy loam, 0 to 2 percent slopes.
Allagash fine sandy loam, 2 to 8 percent slopes.
Allagash fine sandy loam, 8 to 15 percent slopes.
Allagash fine sandy loam, 15 to 25 percent slopes.
Bangor silt loam, 0 to 2 percent slopes.
Bangor silt loam, 2 to 8 percent slopes.
Bangor silt loam, 8 to 15 percent slopes.
Bangor silt loam, 15 to 25 percent slopes.
Bangor very stony silt loam, 0 to 8 percent slopes.
Bangor very stony silt loam, 8 to 15 percent slopes.
Bangor very stony silt loam, 15 to 25 percent slopes.
Colton gravelly sandy loam, dark materials, 0 to 2 percent slopes.
Colton gravelly sandy loam, dark materials, 2 to 8 percent slopes.
Colton gravelly sandy loam, dark materials, 8 to 15 percent slopes.
Colton gravelly sandy loam, dark materials, 15 to 25 percent slopes.
Colton gravelly sandy loam, dark materials, 25 to 45 percent slopes.
Hadley silt loam.
Hermon sandy loam, 2 to 8 percent slopes.
Hermon sandy loam, 8 to 15 percent slopes.
Hermon very stony sandy loam, 2 to 8 percent slopes.
Hermon very stony sandy loam, 8 to 15 percent slopes.
Hermon very stony sandy loam, 15 to 45 percent slopes.
Melrose fine sandy loam, 0 to 2 percent slopes.
Melrose fine sandy loam, 2 to 8 percent slopes.
Melrose fine sandy loam, 8 to 15 percent slopes.
Ondawa fine sandy loam.
Perham silt loam, 0 to 8 percent slopes.
Perham silt loam, 8 to 15 percent slopes.
Perham stony silt loam, 0 to 8 percent slopes.
Perham stony silt loam, 8 to 15 percent slopes.
Plaisted gravelly loam, 2 to 8 percent slopes.
Plaisted gravelly loam, 8 to 15 percent slopes.
Plaisted gravelly loam, 15 to 25 percent slopes.
Plaisted gravelly loam, 25 to 45 percent slopes.
Plaisted very stony loam, 5 to 15 percent slopes.
Plaisted very stony loam, 15 to 45 percent slopes.
Stetson fine sandy loam, 0 to 2 percent slopes.
Stetson fine sandy loam, 2 to 8 percent slopes.
Stetson fine sandy loam, 8 to 15 percent slopes.
Stetson fine sandy loam, 15 to 25 percent slopes.
Stetson-Suffield complex, 0 to 15 percent slopes.
Stetson-Suffield complex, 15 to 45 percent slopes.

Group 2a:

Hermon extremely stony sandy loam, 5 to 15 percent slopes.
Plaisted extremely stony loam, 5 to 15 percent slopes.
Stony land, Hermon material, strongly sloping.
Stony land, Plaisted material, strongly sloping.

Group 3:

Daigle silt loam, 0 to 2 percent slopes.
Daigle silt loam, 2 to 8 percent slopes.
Daigle silt loam, 8 to 15 percent slopes.
Daigle stony silt loam, 0 to 2 percent slopes.
Daigle stony silt loam, 2 to 8 percent slopes.
Daigle stony silt loam, 8 to 15 percent slopes.
Dixmont silt loam, 0 to 2 percent slopes.
Dixmont silt loam, 2 to 8 percent slopes.
Dixmont silt loam, 8 to 15 percent slopes.
Dixmont very stony silt loam, 0 to 2 percent slopes.
Dixmont very stony silt loam, 2 to 8 percent slopes.
Dixmont very stony silt loam, 8 to 15 percent slopes.
Elmwood fine sandy loam, 0 to 8 percent slopes.
Howland gravelly loam, 0 to 8 percent slopes.
Howland gravelly loam, 8 to 15 percent slopes.
Howland very stony loam, 0 to 8 percent slopes.
Howland very stony loam, 8 to 15 percent slopes.
Howland very stony loam, 15 to 25 percent slopes.
Machias fine sandy loam, 0 to 8 percent slopes.
Madawaska very fine sandy loam, 0 to 8 percent slopes.
Podunk fine sandy loam.
Winooski silt loam.

Group 4:

Bangor silt loam, moderately deep, 2 to 8 percent slopes.
Bangor silt loam, moderately deep, 8 to 15 percent slopes.
Bangor silt loam, moderately deep, 15 to 35 percent slopes.
Hermon sandy loam, moderately deep, 2 to 8 percent slopes.
Hermon sandy loam, moderately deep, 8 to 15 percent slopes.
Thorndike shaly silt loam, 2 to 8 percent slopes.
Thorndike shaly silt loam, 8 to 15 percent slopes.
Thorndike shaly silt loam, 15 to 25 percent slopes.
Thorndike shaly silt loam, 25 to 45 percent slopes.
Thorndike very stony silt loam, 2 to 8 percent slopes.
Thorndike very stony silt loam, 8 to 15 percent slopes.
Thorndike very stony silt loam, 15 to 35 percent slopes.

Group 5:

Buxton, Scantic, and Biddeford stony silt loams, 0 to 8 percent slopes.
Limerick silt loam.
Monarda silt loam, 0 to 8 percent slopes.
Monarda and Burnham very stony silt loams, 0 to 8 percent slopes.
Monarda and Burnham extremely stony silt loams, 0 to 15 percent slopes.
Red Hook and Atherton fine sandy loams, 0 to 8 percent slopes.
Red Hook and Atherton silt loams, 0 to 8 percent slopes.
Scantic silt loam, 0 to 8 percent slopes.

Group 6:

Adams loamy sand, 0 to 8 percent slopes.
Adams loamy sand, 8 to 15 percent slopes.
Adams loamy sand, 15 to 45 percent slopes.
Colton cobbly sandy loam, dark materials, 0 to 8 percent slopes.
Colton cobbly sandy loam, dark materials, 8 to 15 percent slopes.
Colton cobbly sandy loam, dark materials, 15 to 25 percent slopes.
Colton cobbly sandy loam, dark materials, 25 to 45 percent slopes.
Colton loamy fine sand, dark materials, 0 to 2 percent slopes.
Colton loamy fine sand, dark materials, 2 to 8 percent slopes.
Colton loamy fine sand, dark materials, 8 to 15 percent slopes.
Colton loamy fine sand, dark materials, 15 to 25 percent slopes.

Group 7:

Canaan extremely rocky sandy loam, 5 to 15 percent slopes.
Canaan extremely rocky sandy loam, 15 to 45 percent slopes.
Rockland, Canaan material, sloping.
Rockland, Thorndike material, sloping.
Thorndike very rocky silt loam, 2 to 8 percent slopes.
Thorndike very rocky silt loam, 8 to 15 percent slopes.

Group 8:

Biddeford silt loam, 0 to 3 percent slopes.
Burnham silt loam, 0 to 3 percent slopes.
Mixed alluvial land.
Saco silt loam.

Group 9:

Made land.
Muck.
Peat and muck.
Peat, coarsely fibrous.
Peat, moderately fibrous.
Peat, sphagnum.
Riverwash.
Rockland, Canaan material, strongly sloping.
Rockland, Thorndike material, strongly sloping.
Rock outcrop.

Wildlife and Soils [4]

This section tells about the potential of the soils of Penobscot County as habitats for (1) deer, varying hare, ruffed grouse, and woodcock, and (2) for waterfowl.

Originally, woodland caribou, moose, deer, bear, and such small game as varying hare, grouse, woodcock, and black duck supported several tribes of Indians. The Indians and early settlers fished and trapped extensively. Now, hunting and fishing are enjoyed mostly by local and visiting sportsmen, who bring substantial income into the county. Consequently, the management of wildlife is important.

The agencies primarily responsible for the management of wildlife are the Maine Department of Inland Fisheries and Game, the Maine Forest Service, and allied agencies of several departments of the Federal Government. Their programs include the stocking of inland waters with game fish, the development and management of fish and game habitats, the regulation of fish and game seasons, and the protection of woodlands from fire and pests.

The occurrence and abundance of some species of wildlife are related to the soils. Most of the relationships are indirect and are influenced primarily by land use, kinds of plant cover (both in virgin and cultivated areas), and topography. The kinds and amounts of certain wildlife, especially waterfowl, are directly related to soil characteristics, such as wetness. The abundance, size, and reproductive capacity of deer, rabbit, and some other species have some relation to soil fertility.

Wildlife Species

In Penobscot County the principal species of large game are deer and bear, but deer are by far the more important. There have been no caribou in the county for many years, and the moose, thinly scattered in groups of two or three, range near isolated marshes and bogs. Moose have not been hunted legally since 1936.

Small game includes ruffed grouse, varying hare, squirrel, and woodcock. Teal, wood duck, and black duck are hunted along streams and lakes, and other ducks and the Canada goose are hunted when they migrate south. The economic value of furbearers, particularly beaver and mink, fluctuates greatly. Trapping was once important but is no longer of much significance. Some trapping of beaver and mink, as well as muskrat, otter, and fisher, is still done. Fisher have recently reinhabited the county.

The principal game fish are black bass, pickerel, white perch, landlocked salmon, togue, brook trout, and fresh-water smelt.

Table 7 lists some of the important kinds of wildlife and shows the potential on the soils of the county for various kinds of wildlife habitat. Information in table 7, when used along with the detailed soil map in the back of the report, is helpful in (1) appraising the values of specific soils for particular species of game; (2) locating various kinds of habitat; (3) determining how habitats can be improved and in planning needed treatments; and (4) locating areas to be acquired and improved for wildlife and recreation.

Each soil has been rated in table 7 in terms of the likelihood that a given kind of habitat may occur on it and can be developed through appropriate use and treatment. The ratings, *excellent*, *good*, or *fair*, take into account topography, wetness, suitability for use, and kind of natural vegetation. For example, Dixmont silt loam, 2 to 8 percent slopes, an upland soil, is somewhat wet and mostly in woods, but it is suitable for grass and alfalfa. The natural vegetation consists of mixed softwoods (spruce, fir, white-cedar, and pine) and some maple, poplar, and yellow birch. Because of the kind of plants and the topography, coniferous winter cover for deer likely would be rated good on this soil. The absence of abundant hardwoods reduces the potential of brush and hardwood habitats for deer to only fair. The soil has a limited amount of grassland and is rated as fair for this kind of deer habitat. There are a few wet areas of pasture where alder thickets grow, and in table 7 these are rated fair under the heading "Alder thickets and hardwood swamps." The thick growth of conifers, especially spruce, fir, and white-cedar, results in a fair rating for coniferous cover for ruffed grouse.

If no rating is given in table 7, the soil is either unsuitable as a particular habitat or its suitability is unknown.

Discussions of the important kinds of wildlife listed in table 7 follow.

Deer.—The principal habitats of deer in Penobscot County are (1) areas of coniferous woods, (2) brushland

[4] PHILIP F. ALLAN, Northeast biologist, Soil Conservation Service, assisted in the preparation of this section.

TABLE 7.—*Soils of Penobscot County rated according*

[Ratings "excellent," "good," and

Soils and map symbols	Deer				Varying hare	
	Coniferous woods	Brushland and hardwood areas	Grassland	Alder thickets and hardwood swamps	Conifers	Alder thickets and hardwood swamps
Adams:						
AaB, AaC	Fair	Fair			Fair	
AaE	Good	Good			Fair	
Allagash:						
AgA, AgB, AgC, AgD	Fair	Good	Good			
Bangor:						
BaA, BaB, BaC, BaD, BmB, BmC, BmD	Good	Excellent	Excellent		Fair	
BnB, BnC, BnD	Good	Good	Fair		Good	
Biddeford:						
BoA	Excellent			Good	Excellent	Good
Burnham:						
BrA	Excellent	Good	Fair	Excellent	Excellent	Excellent
Buxton:						
BuA, BuB, BuC	Good		Excellent	Fair	Good	Good
Buxton, Scantic, and Biddeford:						
BxB	Excellent	Fair		Fair	Excellent	Excellent
Canaan:						
CaC	Fair	Good				
CaE	Fair	Fair				
Colton:						
Cobbly sandy loam, dark materials—						
CcB, CcC, CcD, CcE	Fair	Good				
Gravelly sandy loam, dark materials—						
CnA, CnB, CnC, CnD, CnE	Fair	Fair	Fair			
Loamy fine sand, dark materials—						
CsA, CsB, CsC, CsD	Fair	Good	Fair		Fair	
Daigle:						
DaA, DaB, DaC, DgA, DgB, DgC	Good	Good	Good	Good	Good	Good
Dixmont:						
DxA, DxB, DxC, DyA, DyB, DyC	Good	Fair	Good	Good	Good	Good
Elmwood:						
EwB	Fair	Excellent	Excellent	Good		Good
Hadley:						
Ha	Fair	Excellent	Excellent		Fair	
Hermon:						
HbB, HbC, HdB, HdC	Good	Excellent	Excellent		Fair	
HeB, HeC	Good	Good	Fair		Good	
HeE, HhC	Good	Excellent	Fair		Good	
Howland:						
HoB, HoC, HvB, HvC, HvD	Good	Good	Good	Good	Good	Good
Limerick:						
Lk	Good	Excellent		Excellent	Good	Excellent
Machias:						
MaB	Fair	Good	Good			
Madawaska:						
MbB	Fair	Good	Good			
Melrose:						
MeA, MeB, MeC	Fair	Good	Excellent		Fair	
Mixed alluvial land:						
Mn	Good	Excellent	Good	Good	Good	Good
Monarda:						
MoB	Excellent	Fair	Excellent	Excellent	Excellent	Excellent
Monarda and Burnham:						
MrB, MsC	Excellent	Fair	Excellent	Excellent	Excellent	Excellent
Muck:						
Mu	Excellent	Good		Excellent	Excellent	Excellent
Ondawa:						
On	Fair	Excellent	Excellent		Fair	
Peat and muck:						
Pa	Excellent	Good		Excellent	Excellent	Excellent
Peat:						
Pc, Pf, Ps	Good	Good			Excellent	
Perham:						
PhB, PhC, PmB, PmC	Good	Excellent	Excellent		Fair	

to their potential as habitats for important wildlife

"fair," are explained in the text]

Ruffed grouse				Woodcock		
Coniferous woods	Brushland and hardwood areas	Aspen and birch groves	Alder thickets and hardwood swamps	Alder thickets and hardwood swamps	Brushland and hardwood areas	Aspen and birch groves
Fair	Fair	Fair			Fair	Fair.
Good	Good	Good			Fair	Good.
Fair	Good	Good			Fair	Good.
Good	Excellent	Good			Excellent	Excellent.
Good	Good	Excellent			Good	Good.
Fair			Fair	Good		
Fair	Good	Fair	Excellent	Excellent	Fair	Fair.
Good			Good	Good		
Good	Fair		Good	Good		
Excellent	Good	Good				Fair.
Fair	Fair	Fair				
Good	Good	Good			Fair	Excellent.
Fair	Fair	Good			Fair	Fair.
Good	Good	Good				Fair.
Good	Fair	Fair	Good	Good	Fair	Fair.
Fair	Fair	Fair	Good	Good	Fair	Fair.
Excellent	Excellent	Excellent	Good	Good	Excellent	Excellent.
Excellent	Good	Fair			Fair	
Good	Excellent	Excellent			Good	Good.
Good	Good	Excellent			Good	Good.
Good	Excellent	Excellent			Fair	Fair.
Fair	Fair	Fair	Good	Good	Fair	Fair.
Fair	Good	Fair	Excellent	Excellent	Fair	
Good	Good	Good			Fair	Fair.
Good	Good	Good			Fair	Fair.
Good	Good	Fair			Fair	Fair.
Good	Good	Good	Good	Good	Good	Good.
Fair	Fair	Fair	Excellent	Excellent	Fair	Fair.
Fair	Fair	Fair	Excellent	Excellent	Fair	Fair.
Fair	Good	Good	Excellent	Excellent		Good.
Excellent	Good	Fair	Excellent		Fair	
Fair	Fair	Good	Excellent	Fair		
Good	Good	Fair				
Good	Excellent	Excellent			Excellent	Excellent.

TABLE 7.—*Soils of Penobscot County rated according to their*

Soils and map symbols	Deer				Varying hare	
	Coniferous woods	Brushland and hardwood areas	Grassland	Alder thickets and hardwood swamps	Conifers	Alder thickets and hardwood swamps
Plaisted:						
PgB, PgC, PgD, PrC	Good	Excellent	Excellent		Fair	
PgE, PrE, PxC	Good	Excellent	Fair		Good	
Podunk:						
Py	Fair	Excellent	Excellent	Excellent	Fair	Excellent
Red Hook and Atherton:						
RaB, RdB	Excellent	Fair	Fair	Excellent	Excellent	Excellent
Rockland, Canaan material:						
RkC, RkD	Good	Fair			Good	
Rockland, Thorndike material:						
RmC, RmD	Good	Fair			Good	
Saco:						
Sa	Fair	Excellent		Excellent	Fair	Excellent
Scantic:						
ScB	Excellent	Fair		Fair	Excellent	Fair
Stetson:						
SeA, SeB, SeC, SeD	Good	Excellent	Excellent		Fair	
Stetson-Suffield complex:						
SfC	Good	Excellent	Excellent		Good	
SfE	Fair	Fair	Fair		Fair	
Stony land, Hermon material:						
ShD	Fair	Fair			Fair	
Stony land, Plaisted material:						
SpD	Fair	Fair			Fair	
Suffield:						
SuA, SuB, SuC, SuC2, SuD, SuD2, SvA, SvB, SvC, SvD.	Good	Good	Excellent	Fair	Fair	Fair
SuE	Fair	Fair	Fair		Fair	
Thorndike:						
ThB, ThC, ThD, TkB, TkC	Good	Good	Good		Good	
ThE, TvB, TvC, TvD	Fair	Good			Fair	
Winooski:						
Wn	Fair	Excellent	Excellent	Excellent	Fair	Excellent

and hardwood areas, (3) grassland, and (4) alder thickets and hardwood swamps.

Good coniferous habitats are in white-cedar woods on the Biddeford, Burnham, and Dixmont soils. Brushland and hardwood areas occur on Bangor, Hermon, Perham, Plaisted, and Stetson soils. Grassland habitats prevail on Buxton, Melrose, Plaisted, Podunk, Stetson, Suffield, and Winooski soils. Alder thickets and hardwood swamps are on Burnham, Limerick, and Podunk soils, on Muck, and on some areas of Peat.

Deer use heavy coniferous woods, such as spruce-fir flats, for winter yards. White-cedar woods are especially valuable as feeding areas. In brushland and hardwood areas, deer feed on twigs of shrubs and on tree sprouts, principally in winter. They use thickets as resting cover in spring, summer, and fall. Overgrown, abandoned pastures, cutover hardwoods, and windthrow areas provide additional habitats. In areas of grassland, deer use grasses, legumes, and other herbaceous plants for summer and fall grazing and, when available, for emergency food in winter. These plants occur in meadows, pastures, and fields in which cultivated crops are grown. Deer frequent alder thickets and hardwood swamps in fall and winter, principally for feeding.

Varying hare.—Important habitats of the varying hare are (1) coniferous woods and (2) alder thickets and hardwood swamps. The spruce-fir flats and other extensive stands of conifers are good habitats, especially when the stands are young.

Many areas of Biddeford, Burnham, Monarda, Red Hook and Atherton, and Scantic soils and Peat and Muck have suitable coniferous woods for the varying hare. Alder thickets and hardwood swamps occur on the Burnham, Limerick, Podunk, Saco, and Winooski soils.

Varying hare use fir, spruce, and pine, particularly in young or dwarfed stands, for food and cover. Stands of conifers that have a canopy at a height of less than 25 feet are good habitats. Alder thickets and hardwood swamps, which serve as secondary habitats, also provide food and cover for the varying hare.

Ruffed grouse.—The ruffed grouse is the principal game bird in the county. The main habitats are (1) coniferous woods, (2) brushland and hardwood areas, (3) aspen and birch groves, and (4) alder thickets and hardwood swamps. Ruffed grouse require a somewhat different kind of coniferous woods than deer and varying hare. Fairly young stands of white pine, such as might occur on the Canaan, Elmwood, Hadley, Hermon, Ondawa, Perham, Plaisted, and Stetson soils, are most suitable. Ruffed grouse also frequent brushland and hardwood

potential as habitats for important wildlife—Continued

Ruffed grouse				Woodcock		
Coniferous woods	Brushland and hardwood areas	Aspen and birch groves	Alder thickets and hardwood swamps	Alder thickets and hardwood swamps	Brushland and hardwood areas	Aspen and birch groves
Good	Excellent	Excellent			Good	Good.
Good	Excellent	Excellent			Fair	Fair.
Good	Excellent	Good	Excellent	Excellent	Fair	Fair.
Fair	Fair	Fair	Excellent	Excellent		Fair.
Good	Fair	Fair				
Good	Fair	Fair				
Fair	Fair	Fair	Excellent	Good		Fair.
Fair	Fair		Fair			
Excellent	Excellent	Excellent			Good	Good.
Excellent	Excellent	Excellent			Good	Good.
Good	Fair	Fair			Fair	Fair.
	Fair	Fair			Fair	Fair.
	Fair	Fair			Fair	Fair.
Good	Good	Good	Fair	Fair	Good	Good.
Good	Fair	Good			Fair	
Good	Good	Excellent			Good	Good.
Good	Good	Fair				
Good	Excellent	Good	Excellent	Excellent	Fair	Fair.

areas on these and other soils. They are likely to be abundant in aspen (poplar) or birch groves on the soils just mentioned. Alder thickets and hardwood swamps, like those on Burnham, Limerick, Podunk, Saco, and Winooski soils and on Muck, also may provide excellent habitats.

Ruffed grouse use coniferous woods for winter cover and often nest in open stands. White pine woods of up to about 30 years of age are used most. Ruffed grouse feed on fruits or shrubs and find fall cover in thickets. They use hardwood areas for nesting and for rearing their broods. Overgrown, abandoned pastures, cutover forests, windthrow areas, and woods are especially suitable. Ruffed grouse use alder thickets and hardwood swamps for fall feeding and cover. They feed in aspen and birch groves in summer, fall, and winter. Buds of aspen (poplar) and birch and birch catkins are important winter foods.

Woodcock.—Major habitats of the woodcock are (1) alder thickets and hardwood swamps, (2) brushland and hardwood areas, and (3) aspen and birch groves. Woodcock prefer brushlands that have young white pines—those not so far advanced toward woodlands as those favored by ruffed grouse. They also prefer young aspen and birch groves instead of those made up of large trees.

Alder thickets suitable for woodcock are likely to occur on the Burnham, Limerick, Podunk, and Winooski soils. Brushlands suitable for woodcock nesting may occur on Elmwood and Perham soils and in favorable spots on Plaisted, Stetson, Suffield, Thorndike, and other soils. Aspen (poplar) and birch groves used by woodcock most likely will be on Colton, Elmwood, and Perham soils.

Woodcock frequent alder thickets and hardwood swamps for feeding early in spring and in summer and fall. They use brushy areas and sites that have young hardwoods and white pine as courtship and nesting areas. They frequent thickets for feeding. Overgrown, abandoned pastures are especially perferred by woodcock. Woodcock feed on earthworms and insects in fairly open, moist groves of sapling-sized aspen and birch, especially late in summer and in fall.

Suitability and Classification of the Wet Lands

The wet and very wet soils of the county, for example the Scantic, Biddeford, Monarda, Burnham, Red Hook and Atherton, and Saco, are good sites for water developments, such as game-fish ponds, waterfowl ponds, and

TABLE 8.—*Classification and evaluation of wetland types* [1]

Wetland types	Number of areas	Wetland types commonly associated	Use by waterfowl [2]	Dominant natural plants	Value of wetland acreage to waterfowl: High	Moderate	Low	Negligible	Total
					Acres	*Acres*	*Acres*	*Acres*	*Acres*
2. Fresh meadows	70	3, 6, 7, 8	Nesting, feeding	Grasses, sedges	(3)	720	815	515	2, 050
3. Shallow fresh marshes (inland).	55	2, 4	Feeding, migrating, nesting.	Grasses, cattail, bulrush.	(3)	820	725	50	1, 595
4. Deep fresh marshes (inland).	30	3, 5	Feeding, migrating	Wildrice, pondweed, cattail, round-stemmed bulrush.	680	230	260	5	1, 175
5. Open fresh water (inland).	17	2, 3, 4	Feeding, migrating	Spatterdock, pondweed, coontail, water lily.	40	830	260	35	1, 165
6. Shrub swamps	165	2, 7, 8	Nesting, feeding, migrating.	Alder, willow	(3)	2, 035	3, 780	1, 345	7, 160
7. Wooded swamps	380	2, 6, 8	Nesting, feeding, migrating.	Tamarack, black spruce, red maple.	960	20, 480	39, 590	22, 555	83, 585
8. Bog	150	6, 7	Nesting, feeding, migrating.	Cranberry, sedges, sphagnum moss, leatherleaf.	860	14, 155	22, 190	3, 725	40, 930
19. Sounds and bays	3	(3)	Wintering, feeding, migrating.	None	630	(3)	(3)	(3)	630
Total					3, 170	39, 270	67, 620	28, 230	138, 290

[1] Adapted from Wetlands Inventory of Maine.
[2] Wetlands are used only by ducks in Penobscot County. Different uses are listed in order of importance.
[3] None.

marshes. Muck and Peat and other marshy areas are also suitable. The well-drained ridges of Hermon and Plaisted soils support good stands of beech and, in some places, oak. Hazelnut grows on the lowlands. During years when mast is plentiful, deer, bear, and squirrel frequent these areas. The soil map in the back of this report helps one to pick out, enlarge, and establish deeryards; to locate cover for grouse and pheasant; and to indicate wildlife marshes.

The U.S. Fish and Wildlife Service has placed the wetlands of the United States in 20 types of wildlife habitats. Of these, eight are common in Penobscot County. A study of Penobscot County made in 1953–54 indicates that types 6, 7, and 8 are the most common, and types 2, 3, and 4, in order, are the next most common. Types 5 and 19 are of limited extent.

In table 8 each wetland type in Penobscot County is classified and evaluated. The wetland types of habitats in this county are defined in the following paragraphs, and the names of soils in each habitat are given.

Type 2. Fresh meadows: Soils waterlogged throughout most of the growing season. Vegetation mainly of various grasses. Soils in this group are Biddeford, Scantic, Burnham, Monarda, and Saco.

Type 3. Shallow fresh marshes (inland): Soils normally waterlogged during growing season and may be flooded at times with as much as 6 inches of water. Vegetation usually grasses, cattail, and bulrush. Consists of wet areas of Biddeford, Burnham, Saco, Red Hook and Atherton, and Limerick soils, and of Peat and Muck.

Type 4. Deep fresh marshes (inland): Soils covered with 6 inches to 3 feet of water. Vegetation mainly cattail, round-stemmed bulrush, wildrice, and various other emergent and true aquatic plants. Consists of wet areas of Saco soils, of Peat and Muck, and of some areas delineated as marshes on the soil map.

Type 5. Open fresh water (inland): Open water up to 10 feet deep with floating-leaf and submerged vegetation. Common plants—pondweed, coontail, spatterdock, and water lily. Type 5 is largely intermittent lakes and shallow ponds.

Type 6. Shrub swamps: Soils normally waterlogged during growing season. May be covered with as much as 6 inches of water. Vegetation, usually alder; some willow, buttonbush, and dogwood. Consists of Peat and Muck and wetter areas of the Biddeford, Limerick, and Saco soils.

Type 7. Wooded swamps: Soils normally waterlogged during growing season. Timbered with tamarack, red maple, and black spruce. The soils are Muck, Burnham, Biddeford, and Red Hook and Atherton.

Type 8. Bog: Soils normally waterlogged at all times. In Maine, the vegetation consists of various heath plants and sedges. Common are leatherleaf, sphagnum moss, cranberry, sedges, and Labrador-tea. The soils are Peat, coarsely fibrous; Peat, moderately fibrous; and Peat, sphagnum.

Type 19. Sounds and bays: Mudflat areas left bare at low tide. No appreciable amount of vegetation was observed on the mudflats during the time the inventory for Penobscot County was made.

Descriptions of the Soils

This section is provided for those who want detailed information about the soils of the county. It describes the groups of similar soils (soil series) and the single

soils, or mapping units, in each of these series. It also describes intricately mixed soils of different series (soil complexes) that were mapped as a unit, and undifferentiated soils mapped as a unit. Some miscellaneous land types are also described, as, for example, Rockland, Canaan material, sloping. The individual soils or other mapping units are the areas shown on the detailed soil map and identified by a symbol.

An important part of this section is the description of each soil series, which includes statements about the general nature of the soils in the series and their relation to soils of other series. The series description also includes statements concerning topography, drainage, and native vegetation.

The description of the individual soils follows the series description. All the soils of one series that have the same texture in the surface layer belong to one soil type and are described together. For example, all Colton soils that have a cobbly sandy loam surface soil are described, and then all Colton soils that have a gravelly sandy loam surface soil. Following the name of each soil, in parentheses, is the symbol used to identify this soil on the map. At the end of the description of each soil, use and management is briefly discussed and the capability unit for the soil is given (see section "Capability Groups of Soils").

Because most of the characteristics of the soils of a series are given in the series description, the individual soils generally are described only as they differ from the series description. Complexes or undifferentiated soils in one mapping unit are described only generally, as each member soil will be described separately in its respective place in the report.

An important part of each series description is the soil profile, a record of what the soil scientist saw and learned when he dug into the ground. It is to be assumed that all soils of one series have essentially the same kind of profile. The differences, if any, are explained in the description of the soil or are indicated in the soil name. To illustrate, a detailed profile is described for the Colton series, and the reader is to conclude that all soils in the Colton series have essentially the same kind of profile.

In describing soils, the scientist frequently assigns a letter symbol, for example "A_2," to a specific layer of the profile. These letter symbols have special meaning to soil scientists and others who make detailed studies of soils. Most readers will need to remember only that all letter symbols beginning with "A" are surface soil or subsurface soil; those beginning with "B" are subsoil, but in soils where the B horizon is thin or lacking, the upper C horizon is called subsoil; those beginning with "C" are substratum, or parent material; and those beginning with "D" are underlying rock or other material. All references to "deep" and "shallow" in this report mean depth to bedrock unless otherwise specified.

The color of a soil can be described in words, such as "yellowish brown," or it can be stated in more precise terms by giving symbols for the hue, value, and chroma, such as "10YR 5/4." For most layers in the soils, the symbols for color, called Munsell notations, are given along with the word descriptions of color. Complexes of colors in soil layers also occur, and these are described by notations on mottling. The colors given in the profile descriptions are for moist soils unless otherwise stated.

The location and distribution of the single soils or other mapping units are shown on the soil map at the back of this report. Their approximate acreage and proportionate extent are given in table 9. It will be helpful to refer to the Glossary at the end of the report, where special terms used in describing soils are defined.

TABLE 9.—*Approximate acreage and proportionate extent of soils mapped*

Soil	Acres	Percent
Adams loamy sand, 0 to 8 percent slopes	6,324	0.3
Adams loamy sand, 8 to 15 percent slopes	1,610	.1
Adams loamy sand, 15 to 45 percent slopes	474	(1)
Allagash fine sandy loam, 0 to 2 percent slopes	94	(1)
Allagash fine sandy loam, 2 to 8 percent slopes	1,978	.1
Allagash fine sandy loam, 8 to 15 percent slopes	533	(1)
Allagash fine sandy loam, 15 to 25 percent slopes	210	(1)
Bangor silt loam, 0 to 2 percent slopes	959	(1)
Bangor silt loam, 2 to 8 percent slopes	14,786	.7
Bangor silt loam, 8 to 15 percent slopes	3,511	.2
Bangor silt loam, 15 to 25 percent slopes	190	(1)
Bangor silt loam, moderately deep, 2 to 8 percent slopes	35,187	1.6
Bangor silt loam, moderately deep, 8 to 15 percent slopes	8,089	.4
Bangor silt loam, moderately deep, 15 to 35 percent slopes	1,861	.1
Bangor very stony silt loam, 0 to 8 percent slopes	94,132	4.3
Bangor very stony silt loam, 8 to 15 percent slopes	35,421	1.6
Bangor very stony silt loam, 15 to 25 percent slopes	884	(1)
Biddeford silt loam, 0 to 3 percent slopes	61,812	2.8
Burnham silt loam, 0 to 3 percent slopes	1,651	.1
Buxton silt loam, 0 to 2 percent slopes	7,084	.3
Buxton silt loam, 2 to 8 percent slopes	25,530	1.2
Buxton silt loam, 8 to 15 percent slopes	1,335	.1
Buxton, Scantic, and Biddeford stony silt loams, 0 to 8 percent slopes	47,029	2.2
Canaan extremely rocky sandy loam, 5 to 15 percent slopes	19,898	.9
Canaan extremely rocky sandy loam, 15 to 45 percent slopes	27,210	1.2
Colton cobbly sandy loam, dark materials, 0 to 8 percent slopes	2,061	.1
Colton cobbly sandy loam, dark materials, 8 to 15 percent slopes	5,640	.3
Colton cobbly sandy loam, dark materials, 15 to 25 percent slopes	479	(1)
Colton cobbly sandy loam, dark materials, 25 to 45 percent slopes	736	(1)
Colton gravelly sandy loam, dark materials, 0 to 2 percent slopes	95	(1)
Colton gravelly sandy loam, dark materials, 2 to 8 percent slopes	12,788	.6
Colton gravelly sandy loam, dark materials, 8 to 15 percent slopes	8,374	.4
Colton gravelly sandy loam, dark materials, 15 to 25 percent slopes	2,484	.1
Colton gravelly sandy loam, dark materials, 25 to 45 percent slopes	1,242	.1
Colton loamy fine sand, dark materials, 0 to 2 percent slopes	322	(1)

See footnote at end of table.

TABLE 9.—*Approximate acreage and proportionate extent of soils mapped*—Continued

Soil	Acres	Percent
Colton loamy fine sand, dark materials, 2 to 8 percent slopes	3, 635	0. 2
Colton loamy fine sand, dark materials, 8 to 15 percent slopes	140	([1])
Colton loamy fine sand, dark materials, 15 to 25 percent slopes	84	([1])
Daigle silt loam, 0 to 2 percent slopes	288	([1])
Daigle silt loam, 2 to 8 percent slopes	1, 889	. 1
Daigle silt loam, 8 to 15 percent slopes	344	([1])
Daigle stony silt loam, 0 to 2 percent slopes	59	([1])
Daigle stony silt loam, 2 to 8 percent slopes	1, 904	. 1
Daigle stony silt loam, 8 to 15 percent slopes	203	([1])
Dixmont silt loam, 0 to 2 percent slopes	4, 199	. 2
Dixmont silt loam, 2 to 8 percent slopes	28, 263	1. 3
Dixmont silt loam, 8 to 15 percent slopes	624	([1])
Dixmont very stony silt loam, 0 to 2 percent slopes	1, 827	. 1
Dixmont very stony silt loam, 2 to 8 percent slopes	83, 624	3. 8
Dixmont very stony silt loam, 8 to 15 percent slopes	5, 093	. 2
Elmwood fine sandy loam, 0 to 8 percent slopes	3, 709	. 2
Hadley silt loam	344	([1])
Hermon sandy loam, 2 to 8 percent slopes	512	([1])
Hermon sandy loam, 8 to 15 percent slopes	364	([1])
Hermon sandy loam, moderately deep, 2 to 8 percent slopes	228	([1])
Hermon sandy loam, moderately deep, 8 to 15 percent slopes	153	([1])
Hermon very stony sandy loam, 2 to 8 percent slopes	1, 334	. 1
Hermon very stony sandy loam, 8 to 15 percent slopes	4, 033	. 2
Hermon very stony sandy loam, 15 to 45 percent slopes	192	([1])
Hermon extremely stony sandy loam, 5 to 15 percent slopes	31, 369	1. 4
Howland gravelly loam, 0 to 8 percent slopes	7, 231	. 3
Howland gravelly loam, 8 to 15 percent slopes	184	([1])
Howland very stony loam, 0 to 8 percent slopes	160, 830	7. 4
Howland very stony loam, 8 to 15 percent slopes	40, 244	1. 8
Howland very stony loam, 15 to 25 percent slopes	685	([1])
Limerick silt loam	14, 028	. 6
Machias fine sandy loam, 0 to 8 percent slopes	20, 361	. 9
Madawaska very fine sandy loam, 0 to 8 percent slopes	3, 681	. 2
Made land	486	([1])
Melrose fine sandy loam, 0 to 2 percent slopes	76	([1])
Melrose fine sandy loam, 2 to 8 percent slopes	644	([1])
Melrose fine sandy loam, 8 to 15 percent slopes	552	([1])
Mixed alluvial land	6, 431	. 3
Monarda silt loam, 0 to 8 percent slopes	6, 939	. 3
Monarda and Burnham very stony silt loams, 0 to 8 percent slopes	353, 451	16. 2
Monarda and Burnham extremely stony silt loams, 0 to 15 percent slopes	74, 945	3. 4
Muck	21, 872	1. 0
Ondawa fine sandy loam	1, 114	. 1
Peat and Muck	29, 988	1. 4
Peat, coarsely fibrous	1, 379	. 1
Peat, moderately fibrous	21, 516	1. 0
Peat, sphagnum	110	([1])
Perham silt loam, 0 to 8 percent slopes	3, 046	. 1
Perham silt loam, 8 to 15 percent slopes	399	([1]
Perham stony silt loam, 0 to 8 percent slopes	914	([1])
Perham stony silt loam, 8 to 15 percent slopes	329	([1])
Plaisted gravelly loam, 2 to 8 percent slopes	6, 396	0. 3
Plaisted gravelly loam, 8 to 15 percent slopes	5, 086	. 2
Plaisted gravelly loam, 15 to 25 percent slopes	2, 371	. 1
Plaisted gravelly loam, 25 to 45 percent slopes	198	([1])
Plaisted very stony loam, 5 to 15 percent slopes	250, 038	11. 5
Plaisted very stony loam, 15 to 45 percent slopes	55, 029	2. 5
Plaisted extremely stony loam, 5 to 15 percent slopes	12, 903	. 6
Podunk fine sandy loam	2, 291	. 1
Red Hook and Atherton fine sandy loams, 0 to 8 percent slopes	11, 056	. 5
Red Hook and Atherton silt loams, 0 to 8 percent slopes	4, 049	. 2
Riverwash	2, 754	. 1
Rockland, Canaan material, sloping	428	([1])
Rockland, Canaan material, strongly sloping	11, 500	. 5
Rockland, Thorndike material, sloping	16, 606	. 8
Rockland, Thorndike material, strongly sloping	29, 247	1. 3
Rock outcrop	4, 868	. 2
Saco silt loam	16, 719	. 8
Scantic silt loam, 0 to 8 percent slopes	46, 628	2. 1
Stetson fine sandy loam, 0 to 2 percent slopes	700	([1])
Stetson fine sandy loam, 2 to 8 percent slopes	9, 075	. 4
Stetson fine sandy loam, 8 to 15 percent slopes	2, 712	. 1
Stetson fine sandy loam, 15 to 25 percent slopes	1, 072	([1])
Stetson-Suffield complex, 0 to 15 percent slopes	5, 421	. 2
Stetson-Suffield complex, 15 to 45 percent slopes	1, 053	([1])
Stony land, Hermon material, strongly sloping	13, 364	. 6
Stony land, Plaisted material, strongly sloping	7, 092	. 3
Suffield silt loam, 0 to 2 percent slopes	92	([1])
Suffield silt loam, 2 to 8 percent slopes	9, 440	. 4
Suffield silt loam, 8 to 15 percent slopes	1, 564	. 1
Suffield silt loam, 8 to 15 percent slopes, eroded	1, 426	. 1
Suffield silt loam, 15 to 25 percent slopes	966	([1])
Suffield silt loam, 15 to 25 percent slopes, eroded	1, 656	. 1
Suffield silt loam, 25 to 45 percent slopes	284	([1])
Suffield very fine sandy loam, 0 to 2 percent slopes	31	([1])
Suffield very fine sandy loam, 2 to 8 percent slopes	3, 129	. 1
Suffield very fine sandy loam, 8 to 15 percent slopes	1, 917	. 1
Suffield very fine sandy loam, 15 to 25 percent slopes	201	([1])
Thorndike shaly silt loam, 2 to 8 percent slopes	26, 541	1. 2
Thorndike shaly silt loam, 8 to 15 percent slopes	16, 608	. 8
Thorndike shaly silt loam, 15 to 25 percent slopes	1, 575	. 1
Thorndike shaly silt loam, 25 to 45 percent slopes	219	([1])
Thorndike very rocky silt loam, 2 to 8 percent slopes	25, 138	1. 2
Thorndike very rocky silt loam, 8 to 15 percent slopes	55, 971	2. 6
Thorndike very stony silt loam, 2 to 8 percent slopes	67, 880	3. 1
Thorndike very stony silt loam, 8 to 15 percent slopes	47, 418	2. 2
Thorndike very stony silt loam, 15 to 35 percent slopes	4, 285	. 2
Winooski silt loam	4, 216	. 2
Small bodies of water ordinarily included with land area	14, 045	. 6
Total	2, 181, 120	100. 0

[1] Less than 0.1 percent.

Adams Series

The very deep, uniformly sandy soils of the Adams series have formed primarily from granitic materials. They are somewhat excessively drained. The fine and medium sands that make up these soils are at least 4 or 5 feet deep, and in places are many feet deep. The sands were mainly water deposited, but in a few areas they show the influence of wind action as well. The surface soil is dark-brown to strong-brown loamy sand, loose to very friable, and very strongly acid. The subsoil is yellow to light olive-brown fine sand to medium sand, very friable to loose, and very strongly acid to medium acid.

The Adams soils occur on dunelike areas that have gently rolling or rolling relief and on wind-eroded sandy knolls. They are most extensive in the central part of Penobscot Valley, around Greenbush, Passadumkeag, Enfield, and Howland. Long, narrow strips are on terraces and small benches. These terraces and benches are along valleys tributary to the valley of the Penobscot River, as well as elsewhere in the southern part of the county.

The native vegetation was primarily white pine, but red pine, and mixtures of pine, spruce, and fir now grow on the Adams soils.

These soils occur with the well-drained, sandy and gravelly Stetson, the excessively drained cobbly Colton, the moderately well drained to somewhat poorly drained Machias, and the poorly and very poorly drained Red Hook and Atherton soils. They also occur with the well-drained Melrose soils, the well-drained, sandy Suffield soils, and the moderately well drained Elmwood soils, all of which have formed from fine sandy material over silt and clay.

Some areas of the Adams soils have more very fine sand and silt than normal, and these are used for gardens and nurseries. The plowed layer of these areas includes the topmost genetic horizons and is usually a dark yellowish-brown loamy sand, about 9 inches thick.

Profile of Adams loamy sand with slopes of 0 to 2 percent in a wooded area:

A_{00} and A_0 Surface litter of pine needles and twigs, 3 to 4 inches thick.

A_1 0 to 2 inches, black (10YR 2/1) loamy sand; weak, fine, granular structure; very friable; abrupt, smooth boundary.

A_2 2 to 8 inches, light-gray (10YR 7/1) loamy sand; structureless; loose; abrupt, wavy boundary.

B_{21} 8 to 13 inches, dark reddish-brown (5YR 3/4) loamy fine sand; strong, medium, platy structure; extremely firm when moist and cemented when dry (ortstein); clear, wavy lower boundary.

B_{22} 13 to 18 inches, yellowish-red (5YR 4/6) loamy fine sand; weak, thin, platy structure; firm (orterde), friable in lower part; clear, irregular lower boundary.

B_3 18 to 28 inches, brown (10YR 5/3) fine sand; structureless; loose; gradual, wavy lower boundary.

C_1 28 to 48 inches, grayish-brown (2.5YR 5/2) sand; structureless; loose; diffuse, wavy lower boundary.

C_2 48 to 54 inches, gray (N 5/) sand; structureless; loose; diffuse, wavy lower boundary with the underlying coarse, gray granitic sand.

In most places the sandy profile is at least 4 feet deep; in some, however, it has a maximum depth of 6 feet, or more. Silt and clay underlie some areas at a depth of 34 inches, or more.

Adams soils have very rapid permeability. Because they have been strongly leached, the A_2 layer is thick and well defined and a cemented B_{21} forms in some places. In most profiles, however, the A_2 layer is 3 to 4 inches thick and the B_2 is not cemented.

Adams loamy sand, 0 to 8 percent slopes (AaB).—This brown sandy soil with yellow or light olive-brown subsoil is very deep. It has no runoff because rainfall is absorbed very rapidly. This soil is inextensive and occurs in scattered areas along the Penobscot Valley from Greenbush to Woodville and in a few other places along the Kenduskeag Valley. The soil profile is similar to that described for the series.

Included with this soil are small seep spots, a few rock outcrops, and some kettle depressions. These depressions generally contain organic deposits of varying depth.

Adams loamy sand, 0 to 8 percent slopes, is mostly in forest or blueberry barrens, or it is idle. Because it is rapidly permeable and somewhat excessively drained, it is not generally used for row crops. Also, it is not a good soil for pastures. Some of the less coarse-textured areas might be suitable for crops, but the soil would need frequent and heavy applications of fertilizer and heavy applications of lime. Irrigation is needed to produce high yields. Potatoes, canning corn, and beans would be the most suitable crops on cultivated areas. This soil, however, is better suited to pine plantations than to crops and pasture. (Capability unit IIIs-5.)

Adams loamy sand, 8 to 15 percent slopes (AaC).—This soil has a dark-brown surface soil and a yellow or pale olive-brown to gray subsoil and substratum. Runoff is slow because this gently rolling to rolling soil absorbs rainfall rapidly. This soil is subject to erosion in cultivated areas where wind is active, especially where it occurs with soils of mixed sand and clay. The profile is similar to the one described for the series, except that the B_{21} is rarely cemented and the A_2 layer is thinner in many places.

This rolling soil is well suited to pine plantations. It is generally too coarse textured and droughty for crops or grasses. Irrigation and heavy application of amendments, however, will make the soil suitable for agriculture. General crops and management in irrigated and fertilized areas are similar to those for Adams loamy sand, 0 to 8 percent slopes. (Capability unit IVs-5.)

Adams loamy sand, 15 to 45 percent slopes (AaE).—The dark-brown and leached-gray upper layers of this soil are not so thick as those described for the series. The yellow and olive-brown to gray subsoil layers are similar, however, in texture and other characteristics. The rolling to very steep or hilly slopes of this soil will hinder cultivation and irrigation. The soil is so permeable, however, that noticeable erosion occurs only in a few wind blowouts. Water is absorbed rapidly, but both the water-holding and the water-supplying capacity are poor.

This excessively drained sandy soil occurs principally along the terrace escarpments and the sandy hills (or kames) in the central part of Penobscot Valley near Woodville, Howland, and Greenbush. It occurs also in the southern part of the valley along Kenduskeag Stream.

Included with this soil are steep areas of fine sandy loam, steep areas of mixed sand and clay, and a few scattered rock outcrops. Also included are isolated benches with slopes ranging from 8 to 15 percent, and a few stony areas along some of the tributary streams in the central part of the county.

Most of Adams loamy sand, 15 to 45 percent slopes, is forested or is in brushland that was once cleared for blueberries. It is much too steep for row crops. The included areas that are less steep are usually isolated by steeper slopes of the sandy deposits.

This soil is suited to forest, particularly to pines. Some sites are best suited to red pine, and others to white pine. This soil is also well suited to wildlife. (Capability unit VIIs-5.)

Allagash Series

Soils of the Allagash series are well drained and very deep. They have formed on nongravelly stream terraces or glaciofluvial deposits derived from materials that originated from very dark gray, interbedded quartzite and slate. The upper layers are dark yellowish-brown fine sandy loam. They are very friable and very strongly acid. The subsoil is yellowish-brown to light yellowish-brown fine sandy loam and gravelly fine sand. It is firm to loose and medium to slightly acid.

These soils are common along the Penobscot River in the central towns bordering the river, particularly Passadumkeag, Howland, Enfield, and Greenbush. They also occur in small, scattered areas along other stream valleys and north of Mattawamkeag along the East Branch of the Penobscot River.

The native vegetation is mixed hardwoods and softwoods. It consists mainly of white pine, maple, aspen, white birch, and spruce. Hemlock and oak are scattered through the stands.

The Allagash soils are members of a group (catena) that includes the moderately well drained Madawaska, the poorly drained Red Hook, and the very poorly drained Atherton soils, which are on similar parent materials. They are also adjacent to the well-drained Stetson and, in a few places, to the excessively drained Colton soils on gravelly and cobbly outwash. The Allagash soils are similar to the Stetson in many characteristics, but they have deeper upper layers without coarse fragments and have fewer coarse fragments in the subsoil and substratum. They are much finer in texture and contain smaller fragments than the cobbly Colton. The Allagash soils resemble the Adams in their upper layers but have more silt and clay in the B horizons. In addition, they are underlain by gravel and sand instead of mostly by sand.

All of the Allagash soils are very strongly or strongly acid and are low in fertility. They need heavy applications of lime and fertilizer. Some crops need additional nitrogen to produce good yields. Tilled crops benefit from irrigation on nearly all of the soils.

Profile of Allagash fine sandy loam with 0 to 2 percent slopes in a tilled area in a tree nursery:

A_p 0 to 9 inches, dark-brown (10YR 3/3) fine sandy loam; very weak, medium, granular structure; very friable; very strongly acid; abrupt, smooth lower boundary.

B_{21} 9 to 14 inches, brownish-yellow (10YR 6/6) fine sandy loam; very weak, medium, subangular blocky structure; friable; very strongly acid; clear, wavy lower boundary.

B_{22} 14 to 21 inches, yellow (2.5Y 7/6) fine sandy loam; structureless; extremely friable; very strongly acid; gradual, wavy lower boundary.

B_3 21 to 32 inches, pale-yellow (2.5Y 8/4), speckled with gray, loamy fine sand; structureless; loose; very strongly acid; diffuse, wavy lower boundary.

C_1 32 to 42 inches, pale-olive (5Y 6/3), speckled with gray, gravelly loamy fine sand; structureless; loose; strongly acid; 5 to 10 percent coarse fragments of slate, shale, and phyllite; diffuse, wavy lower boundary.

C_2 42 to 56 inches, grayish-brown (2.5Y 5/2), speckled with gray, loamy fine sand; contains small pebbles; structureless; loose; strongly acid; 10 to 20 percent coarse fragments.

There are few coarse fragments in the A and B horizons. Roots extend through most of the profile but are mostly in the upper 12 to 15 inches. Stratified gravel and coarse sand are common in the C horizon, and in places they occur at a depth of 20 inches. In Penobscot County the soils in the Allagash series range from a sandy loam to a fine sandy loam in texture, but only the fine sandy loam is generally tilled or cleared.

Allagash fine sandy loam, 0 to 2 percent slopes (AgA).—This dark-brown to pale-yellow, deep sandy soil of the terraces has a finer texture than the other sandy soils in Penobscot County. It occurs on the nearly level parts of sandy and loamy outwash. Permeability is moderately rapid throughout, and runoff is slow. The soil profile is similar to that described for the series.

Included with this soil are a few shallow depressions consisting of moderately well drained to somewhat poorly drained soil. A few scattered boulders, 4 to 5 feet in diameter, are also included in areas around the edges of fields.

Allagash fine sandy loam, 0 to 2 percent slopes, is well suited to vegetables, canning crops (beans, peas, corn), berries, and potatoes. It is also suitable for nurseries. It warms early in spring and is easily tilled. Erosion is negligible because the soil is nearly level. The soil is low in natural fertility, however, and responds well to lime and fertilizer.

Wooded areas support good stands of white and other pines and some spruce. This soil is naturally well suited to the production of pine. (Capability unit I-5.)

Allagash fine sandy loam, 2 to 8 percent slopes (AgB).—This is a dark-brown to yellowish-brown and pale-yellow soil that occurs near the edges of the terraces and along streams or hills. Relief is more pronounced in these areas, and runoff is consequently a little more rapid than on Allagash fine sandy loam, 0 to 2 percent slopes. Some rill erosion occurs in the spring while the ground is frozen. The profile is similar to that described for the series.

Included with this soil are a few gravelly knolls and a few areas with coarser texture than normal.

This soil is suited to the same crops and trees as the nearly level Allagash fine sandy loam, but because of stronger slope, it requires contour cultivation to control runoff. It is widely used for small fruits and vegetables because of its terrace position in the river valleys where most of the cultivated land occurs. (Capability unit IIe-5.)

Allagash fine sandy loam, 8 to 15 percent slopes (AgC).—This gently rolling soil is dark brown to yellowish brown and pale yellow. It has a profile similar to that described for the series. It absorbs water rapidly but has only moderate capacity to hold and supply water. This soil is principally along the margins of the sandy and loamy outwash terraces. It is also adjacent to rolling and hilly uplands of gravelly glacial till. It is limited in extent. Most of the soils in this slope range on the sandy

terraces are too shallow to gravel to be called Allagash and are classified as Stetson soils.

Included with the gently rolling areas of this soil are knolls of gravelly material. Also included are some areas with a few large stones or boulders scattered over the surface.

Allagash fine sandy loam, 8 to 15 percent slopes, is as well suited to garden crops and nurseries as the less sloping areas of Allagash soils. Its stronger slopes, however, make it erodible when clean tilled, especially when the subsoil remains frozen early in spring after the surface soil has thawed.

Control of runoff and cover crops are needed on this soil. They are particularly important because the soil occurs next to the margins of the glacial terraces, where the wind has a clean sweep. Some areas near the tops of hills are particularly affected by wind erosion. Only a fraction of this soil, however, is cultivated; the rest is in white pine and mixtures of other pine, spruce, and poplar or yellow birch. The soil is well suited to the production of pine. Both sawtimber and pulpwood can be successfully grown. (Capability unit IIIe-5.)

Allagash fine sandy loam, 15 to 25 percent slopes (AgD).—This rolling and moderately steep soil occurs along the edge of the sandy and loamy outwash terraces. The soil profile is similar to that described for the series.

Included with this soil are gravelly knolls, some areas with a few boulders and stones on the surface, and some scattered bedrock outcrops. Also included are mixtures of sandy clay soils that lie adjacent to fine-textured soils in similar positions. Areas with scattered pockets of silt and clay resemble the Stetson-Suffield complex.

If tilled, Allagash fine sandy loam, 15 to 25 percent slopes, is subject to erosion because it is strongly sloping and includes areas that contain clay. Complex practices to control erosion are necessary if row crops are grown. This soil, however, is nearly all in woods or brush. It produces good stands of white and other pine, spruce, and some fir. (Capability unit IVe-5.)

Atherton Series

The soils of the Atherton series are deep, very poorly drained, and very slowly permeable. They have formed from sandy and silty outwash that includes in places some clay varves and streaks of gravel. Outwash materials are from lime-seamed slate, shale, calcareous quartzite, and some granite and gneiss. The surface layers are black or very dark grayish-brown fine sandy loam or silt loam. They are very friable to firm and strongly to medium acid. The subsoil is intensely mottled olive-gray, pale-brown, grayish-brown, and yellow loamy fine sand (clay varves) or gravelly loam to silt loam. This layer is slightly sticky and plastic and slightly acid to neutral.

Atherton soils occur along the principal drainage basins where outwash and eskers (horsebacks) are prominent. In Penobscot County they are mapped only as an undifferentiated group with the Red Hook soils. This group is described with the Red Hook series.

The native vegetation is mostly of the softwoods-spruce-fir type that grows on flats. Larch, hemlock, yellow birch, and alder are scattered through the stands.

The Atherton soils are members of a group that includes the well-drained Stetson and Allagash, the moderately well drained Madawaska or Machias, and the poorly drained Red Hook soils. The Atherton soils are also adjacent to the finer textured Biddeford soils in the southern part of the county.

Profile for Atherton silt loam in a wooded area:

A_{00} and A_0 8 inches to 0, loose litter of leaves and twigs, about 3 inches thick, underlain by a mat of partly decomposed organic material.

A_{11} 0 to 7 inches, black (10YR 2/1) silt loam; strong, medium, granular structure; slightly sticky; strongly acid; abrupt, smooth lower boundary.

A_{12g} 7 to 12 inches, dark grayish-brown (10YR 4/2) silt loam with slight mottling of pale brown or gray; strong, medium, granular structure; slightly sticky; strongly acid; clear, irregular lower boundary.

C_{1g} 12 to 23 inches, silt loam mottled with gray, grayish brown, pale brown, and yellow; strong, thick, platy structure; slightly sticky and plastic; medium acid; 5 to 10 percent coarse fragments; clear, wavy lower boundary.

C_{2g} 23 to 30 inches +, silt loam with strongly mottled pale olive and brown; weak, medium, platy structure; slightly sticky and plastic; 5 to 10 percent coarse fragments; gradual, wavy lower boundary; grades to fine sandy clay and gravelly materials.

The mucky organic material on the surface ranges from 8 inches to nearly 20 inches in thickness. In most areas mineral soil is mixed with the muck, but a few marshy areas are peatlike.

Bangor Series

The soils of the Bangor series are deep to very deep and well drained. They have formed in firm to very firm glacial till that contains a high percentage of silt and clay. In addition to lime-seamed slate, the till includes shale, phyllite, calcareous quartzite, and some sandstone and granite. The surface soil is yellowish-brown silt loam. It is very friable or friable and strongly to medium acid. The subsoil is pale-olive, gritty, heavy silt loam. It is firm or very firm and medium acid to neutral.

These are among the leading agricultural soils in the State. They are most extensive in the southwestern wing of the county around Dexter, Exeter, Corinna, and Corinth, where they occupy wide, broad-topped ridges of glacial till (see fig. 2). They are less extensive in the towns of Patten, Carroll, Prentiss, and Drew. In these areas they are frequently adjacent to the even more silty Perham and Daigle soils.

The native vegetation is largely northern hardwoods and white pine. The commonest trees are hard and soft maple, beech, birch, white pine, and spruce. Ash, oak, and fir are scattered through the stands. Many of the wide, glacial-till ridges on which the Bangor soils formed are known as hardwood ridges.

The Bangor soils are well-drained members of a group that includes the moderately well drained to somewhat poorly drained Dixmont, the poorly drained Monarda, and very poorly drained Burnham soils—all from similar parent material.

The Bangor soils are productive but require most of the fertilizer nutrients, particularly nitrogen, for good yields. Lime is also required for most crops because nearly all Bangor soils are strongly acid in their surface layers.

Profile of Bangor silt loam with a 5 percent slope in a tilled area:

A_p 0 to 7 inches, very dark grayish-brown (10YR 3/2) silt loam; strong, medium, granular structure; friable; pH 5.2; 5 to 10 percent coarse fragments; abrupt, smooth lower boundary.

B_{21} 7 to 11 inches, yellowish-brown (10YR 5/6) silt loam; weak, medium, granular structure; very friable; pH 5.5; contains 5 to 10 percent coarse fragments; clear, wavy lower boundary.

B_{22} 11 to 15 inches, brownish-yellow (10YR 6/8) silt loam; weak, fine, subangular blocky structure; friable; pH 5.5; 10 to 20 percent coarse fragments; clear, wavy lower boundary.

B_3 15 to 21 inches, light olive-brown (2.5Y 5/4) silt loam; weak, medium, platy structure; brittle and breaks into fine, subangular blocky peds; firm; pH 5.5; 20 to 30 percent coarse fragments; gradual, wavy boundary.

C_1 21 to 28 inches, olive (5Y 5/3) silt loam; weak, thick, platy structure; brittle and breaks into medium, subangular blocky peds; very firm; pH 6.0; 30 to 40 percent coarse fragments with noticeable numbers of soft weathered rocks; diffuse, wavy lower boundary.

C_2 28 to 40 inches, olive (5Y 5/4) heavy silt loam; weak, medium, platy structure; very firm; pH 6.0; 30 to 40 percent coarse fragments, including many weathered soft rocks; clear, wavy lower boundary.

C_3 40 to 50 inches, olive (5Y 4/3) heavy silt loam; moderately strong, medium, platy structure; extremely firm (hard when dry); pH 6.5; 30 to 40 percent coarse fragments; diffuse, wavy lower boundary; grades to olive-gray, slaty glacial till.

The amount of coarse fragments in the Bangor soils ranges from about 5 to 40 percent. Texture ranges from silt loam to heavy silt loam. The subsoil is usually slightly sticky and plastic when wet. It becomes less acid with depth. From a depth of 8 to 15 feet, the till is generally nearly neutral or alkaline. The water-absorbing capacity is moderately rapid, but both the water-holding and the water-supplying capacity are good.

In some areas of cultivated soils, the addition of lime has markedly raised the pH of the upper layers.

A profile of Bangor silt loam, moderately deep, is given in the description of Bangor silt loam, moderately deep, 2 to 8 percent slopes. Also, a profile of Bangor very stony silt loam is given in the description of Bangor very stony silt loam, 0 to 8 percent slopes.

Bangor silt loam, 0 to 2 percent slopes (BaA).—This is a very deep, yellowish-brown to olive-gray soil that has developed from olive, slaty glacial till. Runoff is slow. This soil is not extensive and occurs mostly on top of the wide, glacial-till ridges in the southwestern wing of the county near Dexter and Exeter. The profile is similar to that described for the series.

Small areas of soils that are less well drained are included with this soil. These areas are less than 2 acres in size. Also included along the margins of fields are areas that contain a few, scattered stones or boulders.

Bangor silt loam, 0 to 2 percent slopes, is well suited to nearly all the tilled crops, forage crops, and small grains grown in the area. This soil is not so well suited to orchards, because it lacks air drainage in many places. It is very well suited to alfalfa because calcium can be obtained in the lower subsoil. The surface soil needs lime, however, to start the alfalfa. Complete fertilizer and some additional applications of nitrogen will usually produce good yields on this soil. (Capability unit I–3.)

Bangor silt loam, 2 to 8 percent slopes (BaB).—This is a yellowish-brown soil that has developed from olive, slaty glacial till. It is gently sloping and has medium runoff. It occurs on the tops of the wide, glacial-till ridges near Dexter, Exeter, and Corinth and in the central-eastern wing of the county near Lee, Prentiss, and Carroll. It has a profile similar to that described for the series.

Small areas of soil that are less well drained are included with this soil. These areas are less than 2 acres in size. Also included along the margins of fields are areas that have a few, scattered stones and boulders.

Bangor silt loam, 2 to 8 percent slopes, is one of the best soils in the county for crops. It is well suited to nearly all the tilled crops, forage crops, small grains, and small fruits grown in the area. It is also well suited to orchards if air drainage is adequate. The soil is nearly ideal for alfalfa because the subsoil contains lime. The surface soil, however, requires lime to correct the acidity until the alfalfa plants become established. Complete fertilizer and later additions of nitrogen are needed for good yields of all crops. The soil is erodible if tilled up and down the slopes. (Capability unit IIe–3.)

Bangor silt loam, 8 to 15 percent slopes (BaC).—This sloping soil is yellowish-brown to olive and has medium runoff. It occurs on the sides of wide ridges of glacial till in the southwestern and central-eastern wings of the county. It is common in Dexter, Exeter, Corinth, Kenduskeag, Lee, Carroll, and Prentiss, as well as in the nearby towns. This soil has a profile similar to that described for the series.

Seepage spots and areas that contain a few, scattered outcrops and boulders are included with this soil.

Bangor silt loam, 8 to 15 percent slopes, is one of the best soils in the county for crops. It is well suited to nearly all the tilled crops, grasses, grains, small fruits, and orchards grown in the area. The soil is nearly ideal for alfalfa because of the lime in the subsoil. The surface soil, however, requires lime to correct the acidity until the alfalfa plants become established. Complete fertilizer and later additions of nitrogen are also needed for good yields of all crops. This soil is erodible if tilled up and down the slopes. It requires conservation practices that include contour cultivation, stripcropping, and the like. (Capability unit IIIe–3.)

Bangor silt loam, 15 to 25 percent slopes (BaD).—This is a very deep, yellowish-brown silty soil that has developed from olive, slaty glacial till. It has moderately steep slopes and rapid runoff. It is inextensive and occurs along the sides of wide glacial-till ridges in cleared areas in the southwestern and central-eastern wings of the county. The soil has a profile similar to that described for the series, except that the surface soil is thinner in places and the depth to the olive till is less.

Some areas that have a few, scattered outcrops and boulders are included with this soil.

This soil is suited to most crops, including grains and small fruits. It is best suited to pasture and hay or orchards, however, because it is subject to erosion if cultivated. Cultivated areas require complex conservation practices to maintain productivity. Lime, complete fertilizer, and further additions of nitrogen help get good yields on this soil. (Capability unit IVe–3.)

Bangor silt loam, moderately deep, 2 to 8 percent slopes (BmB).—This undulating soil has moderate runoff. It occurs on many small areas over the southwestern and northern parts of the county (fig. 8).

Figure 8.—**Profile of Bangor silt loam, moderately deep.**

Deeper areas of Bangor soils and small spots of the Thorndike and the somewhat poorly drained Dixmont soils are included with this soil.

Profile of Bangor silt loam, moderately deep, with a 5 percent slope in a tilled area:

A_p 0 to 7 inches, dark-brown (10YR 4/3) silt loam; weak, medium, granular structure; very friable; strongly acid; 10 to 20 percent coarse fragments; clear, smooth lower boundary.

B_{21} 7 to 11 inches, yellowish-brown (10YR 5/4) silt loam; weak, medium, granular structure; very friable; very strongly acid; 20 to 30 percent coarse fragments; abrupt, wavy lower boundary.

B_{22} 11 to 18 inches, strong-brown (7.5YR 5/8) silt loam; weak, fine, granular structure; friable; strongly acid; 20 to 30 percent coarse fragments; clear, irregular lower boundary.

B_3 18 to 25 inches, strong-brown (7.5YR 5/6) shaly silt loam; weak, thick, platy structure; very friable; strongly acid; 30 to 40 percent coarse fragments; gradual, wavy lower boundary.

C_1 25 to 34 inches, yellowish-brown (10YR 5/4) shaly silt loam; strong, thin, platy structure; very friable (in this profile) but firm where till is olive and contains a high percentage of silt and clay; medium acid; 40 to 50 percent coarse fragments; abrupt, wavy lower boundary.

D_r 34 to 38 inches +, dark grayish-brown, lime-seamed, broken bedrock of shale or slate.

This moderately deep soil of the upland is not generally erodible, and areas in tilled crops require only a minimum of conservation practices. The soil is well suited to nearly all locally grown tilled and forage crops, small fruits, and orchards. It is also well suited to special crops for greenhouses or nurseries. Alfalfa is suitable where the soil has an average depth of 2 feet or more.

Moderately heavy applications of complete fertilizer and additional applications of nitrogen are needed to obtain good yields of such crops as corn and beans. Most crops also respond to applications of lime, but potatoes grown on soil that is not acid may develop scab. The proper amounts of lime and fertilizer to apply depend on the needs of the crops grown and the present fertility of the soil. (Capability unit IIe–3.)

Bangor silt loam, moderately deep, 8 to 15 percent slopes (BmC).—This soil has a rolling relief and rapid runoff. The profile is similar to that described for Bangor silt loam, moderately deep, 2 to 8 percent slopes.

Deep pockets of shaly material and Thorndike and Dixmont soils are included with this soil. A few areas of poorly drained Monarda soil are included in depressions where seepage water accumulates.

This rolling soil of the upland is suited to most crops, orchards, and small fruits (see fig. 2). It is not so well suited to pasture and hay as the deeper and more moist soils; but with average rainfall, it will provide good grazing. For production of good yields, most crops on this soil require complete fertilizer, additional nitrogen, and lime. Because of the danger of scab, areas in potatoes should not be limed. This soil has more erosion than the moderately deep Bangor soil on 2 to 8 percent slopes because it has steeper and more irregular slopes. Also, erosion is more difficult to control. (Capability unit IIIe–3.)

Bangor silt loam, moderately deep, 15 to 35 percent slopes (BmD).—This hilly soil of the upland has rapid runoff. It has a profile similar to that described for Bangor silt loam, moderately deep, 2 to 8 percent slopes, except that the upper layers are definitely thinner.

Included in this hilly soil are areas with shaly pockets and stone clumps.

This soil is suited to most crops, orchards, and small fruits. If this soil is tilled, it requires erosion control practices. Since the soil has steep and irregular slopes, the practices necessary generally are (1) stripcropping and long rotations or (2) short rotations that include cover crops. Because of the erodibility of this soil, however, it is better used for hay and pasture. Clovers and grasses generally grow well. The deep-rooted plants especially are able to tap the limy material in the underlying bedrock. Some forage and pasture plants, however, may burn out around the few, scattered rock outcrops. Pastures and hay respond well to topdressing of nitrogen, complete fertilizer, and lime. Amounts needed depend on the present condition of the fields, and these amounts can be determined by suitable soil tests. (Capability unit IVe–3.)

Bangor very stony silt loam, 0 to 8 percent slopes (BnB).—This is a very deep, well-drained, yellowish-brown soil that has formed from olive, slaty glacial till. It is gently sloping and has slow runoff. The water-absorbing capacity is moderately rapid. Both the water-holding and water-supplying capacities are good. The stones are 12 to 18 inches in diameter and must be removed before the soil can be cultivated. Stones are less numerous in some of the northern localities. Here, the flat-sided fragments

of shale and slate are only about 10 inches in diameter. This very stony Bangor soil occurs widely over the north-central, east-central and southwestern parts of the county on wide glacial till ridges that are generally forested.

Small areas of less well-drained soils and a few that are only moderately deep are included with this soil. Along the southern Penobscot River Valley, small areas of soils from silt and clay deposits are interspersed in many places with areas of this soil.

Profile of Bangor very stony silt loam with a 5 percent slope and in a wooded area:

- A_0 2 inches to 0, very dark grayish-brown (10YR 3/2) or black loamy mor; weak, coarse, granular structure; loose; extremely acid; abrupt, wavy lower boundary.
- A_1 0 to 2 inches, dark grayish-brown (10YR 4/2) silt loam; weak, medium, granular structure; very friable; pH 5.0; 10 percent coarse fragments; abrupt, irregular lower boundary.
- A_2 2 to 4 inches, light-gray (10YR 6/1) silt loam; very weak, thin, platy structure; very friable; pH 5.0; 10 percent coarse fragments; abrupt, broken lower boundary.
- B_{21} 4 to 10 inches, strong-brown (7.5YR 5/6) silt loam; weak, fine, subangular blocky structure; firm; pH 5.5; 10 to 15 percent coarse fragments; abrupt, irregular lower boundary.
- B_{22} 10 to 20 inches, light yellowish-brown (2.5Y 6/4) silt loam; weak, fine, subangular blocky structure; friable; pH 5.5; 15 percent coarse fragments; clear, wavy lower boundary.
- C_1 20 to 32 inches, olive (5Y 5/3) to olive-gray (5Y 5/2) silt loam; strong, medium, platy structure (brittle and easily broken into medium to fine, subangular blocky peds); very firm; pH 6.0; 15 to 20 percent coarse fragments; diffuse, wavy lower boundary.
- C_2 32 to 50 inches, olive-gray (5Y 5/2) loam; strong, thick, platy structure in place (brittle and easily broken when displaced); very firm; pH 6.0; 15 to 20 percent coarse fragments, including many soft, weathered "ghosts" and slivers of lime-seamed rock; diffuse, wavy lower boundary.
- C_3 50 to 65 inches, olive (5Y 5/6), heavy silt loam; very strong, thick, platy structure; very firm; pH 6.5; 20 to 30 percent coarse fragments; diffuse, wavy lower boundary.

This gently sloping, stony soil supports good stands of northern hardwoods and white pine. The principal species are hard maple, beech, birch, and some ash. Oak and aspen are scattered throughout the stands. Both sawtimber and pulpwood can be easily removed, and woods roads can be easily maintained. This soil is also potentially good for crops. If cleared of trees and stones, it resembles gently sloping, stone-cleared areas of Bangor silt loam. Cleared areas are suited to most crops, grasses, small fruits, and orchards. The soil is moderately productive. (Capability unit VIs–3.)

Bangor very stony silt loam, 8 to 15 percent slopes (BnC).—This is a deep, well-drained, yellowish-brown soil that has formed from very firm, olive, slaty glacial till. It has sloping relief and medium runoff. The water-absorbing capacity is moderately rapid. Both the water-holding and the water-supplying capacities are good. The stones are thinly scattered in some places and somewhat thick in others. Most of them are flat-sided fragments of shale or slate and are between 10 and 20 inches in diameter. Stones will have to be removed before the soil can be cultivated. This soil is common in the north-central, central-eastern, and southwestern parts of the county. It occurs in these areas on wide glacial-till ridges that are generally forested. The soil profile is similar to that described for a wooded area of Bangor very stony silt loam, 0 to 8 percent slopes.

Small areas of less well-drained soils and a few that are only moderately deep are included with this soil. Also included are a few interspersed deposits of silt and clay along the southern part of the valley of the Penobscot River.

Bangor very stony silt loam, 8 to 15 percent slopes, supports good stands of northern hardwoods and white pine. The principal species are hard maple, beech, birch, and some ash. Oak and aspen, as well as white pine, are scattered throughout the stands. Both sawtimber and pulpwood grow rapidly and can be easily harvested. The maintenance of woods roads is relatively easy on this soil. The soil is potentially good for crops. If cleared of trees and stones, it resembles sloping stone-cleared areas of Bangor silt loam and has the same suitability for crops and the same management needs. (Capability unit VIs–3.)

Bangor very stony silt loam, 15 to 25 percent slopes (BnD).—This is a well-drained, very deep, very stony, yellowish-brown soil that has formed from olive, very firm, slaty glacial till. It is moderately steep and has rapid runoff. Stones range from small boulders of granite or gneiss, 15 to 20 inches in diameter, to slabs of slate or shale, 10 to 12 inches to fist size in diameter. This stony soil is common along the sides of the wide glacial-till ridges in the two wings of the county and in the northern part. The soil profile is similar to that described for the wooded area of Bangor very stony silt loam, 0 to 8 percent slopes.

Less well-drained areas and scattered outcrops are included with this soil. Also included are a few interspersed deposits of silt and clay along the southern part of the valley of the Penobscot River.

Bangor very stony silt loam, 15 to 25 percent slopes, supports good stands of northern hardwoods and white pine. Both sawtimber and pulpwood grow rapidly and can be harvested easily. Some areas on slopes adjacent to streams, however, have a tendency to wash out when woods roads are built on them. These areas need some protection in the spring and fall. This soil would be well suited to crops, pasture, and orchards if cleared. The tilled slopes, however, would require complex conservation practices and are better suited to pasture or trees. (Capability unit VIs–3.)

Biddeford Series

The soils of the Biddeford series are very poorly drained, very slowly permeable, and very deep. They have formed from silt and clay deposits of the marine and lacustrine terraces. The surface soil is nearly black or very dark brown heavy silt loam. It is sticky and slightly plastic and is strongly acid to medium acid. The subsoil is intensely mottled gray, brown, and pale-yellow silty clay to bluish-gray silty clay. It is very plastic and sticky and slightly acid to neutral.

The Biddeford soils are extensive only in the southern part of the county along the Penobscot River basin in the towns of Bradley, Orono, Bangor, Brewer, Milford, Old Town, Alton, and Argyle. They extend into swamps and low areas in the surrounding towns.

The Biddeford soils in this county are mostly forested. The native vegetation consists of stands of spruce and fir that include hemlock, larch, and white-cedar. Dense growths of alders, sedges, and rushes are also common where the soil becomes marshy during part of the year.

The Biddeford soils are very poorly drained members of a group that includes the well-drained Suffield, the moderately well drained to somewhat poorly drained Buxton, and the poorly drained Scantic soils from similar parent materials. The Biddeford soils are also adjacent to the well-drained Melrose and the moderately well-drained Elmwood soils that have formed from fine sandy materials, 10 to 30 inches deep over silt and clay.

Only one Biddeford soil—Biddeford silt loam, 0 to 3 percent slopes—is mapped separately in the county. Biddeford stony silt loam is mapped in an undifferentiated unit with Buxton and Scantic silt loams. This undifferentiated unit is discussed under the Buxton series.

Profile of Biddeford silt loam with a 2 percent slope in a wooded area:

- A_0 7 inches to 0, wet, finely fibrous mat of humus and decayed plant residues.
- A_1 0 to 4 inches, black (10YR 2/1) silt loam; moderately strong, medium, granular structure; friable; strongly acid; smooth, gradual lower boundary.
- A_{1g} 4 to 8 inches, very dark gray (10YR 3/1) silty clay loam, gray mottles; massive structure; sticky and plastic; abrupt, smooth lower boundary.
- A_{2g} 8 to 10 inches, bluish-gray (5B 5/1) silty clay loam that is slightly mottled with brown; weak, thin, platy structure; very plastic; strongly acid; clear, wavy lower boundary.
- C_{1g} 10 to 18 inches, intensely mottled brown and gray silty clay; weak, thin, platy structure; very plastic and sticky; medium acid; diffuse, wavy lower boundary.
- C_{2g} 18 to 30 inches, intensely mottled gray and yellow silty clay; massive (cloddy when displaced); very sticky and very plastic; diffuse, wavy lower boundary.
- C_{3g} 30 to 40 inches +, slightly mottled grayish-brown and yellow silty clay; massive (cloddy when displaced); extremely firm; slightly acid; grades to a bluish-gray silty clay near a depth of 50 inches from the surface.

In some places the Biddeford soils are less intensely mottled than in the profile described. In others the bluish-gray color is pronounced throughout the lower horizons. The humus surface layer ranges from 6 to 12 inches in thickness.

Biddeford silt loam, 0 to 3 percent slopes (BoA).—This is a wet, very deep, fine-textured, nearly black and bluish-gray soil. It is generally nearly level and has very slow runoff or is ponded. It occurs mostly on the large spruce-fir flats of the southern towns along the Penobscot River basin. Some gently sloping areas occur in the central and northern parts of the county where there are remnants of glacial lakes. Except where the soil is pastured, it has a profile similar to that described for the series. In pastured areas the upper layers are mixed. They consist of very dark brown silt loam or silty clay loam that is slightly sticky and plastic when wet, friable when moist, and strongly acid.

A few, scattered outcrops and boulders occur on this soil.

Biddeford silt loam, 0 to 3 percent slopes, is best suited to woodland, but some areas are used for pasture or hay. Lime and complete fertilizer and additions of phosphate will help produce good pasture. The soil is entirely too wet and fine textured for other crops, including small fruits. It is best suited to the production of pulpwood, even though the rate of growth may be slower than on other soils. Trees of sawtimber size on this soil are shallow rooted and are blown over by winds of moderate velocity. Roads are also difficult to construct and maintain on this wet soil. Alders and other water-loving plants, if not cut annually, soon cover the roads. Drainage is also very difficult to establish because of the nearly level relief and the high water table in spring. (Capability unit VIw-7.)

Burnham Series

The soils of the Burnham series are deep to very deep and are very poorly drained. They have formed from very firm, silty glacial till that includes lime-seamed slate and shale, or from loamy till from mixed granitic and slaty materials. The surface soil is dark-gray silt loam or loam that is friable and strongly acid to medium acid. It usually has a mat of organic material, several inches thick, on the surface. The subsoil is mottled gray, yellowish-gray, and pale-brown silty clay loam to loam; it is moderately sticky and plastic when wet, and medium to slightly acid or neutral. Burnham soils occur throughout the county in marshy and low areas where there is a high water table.

The native vegetation consists of softwoods, mostly spruce and fir. White-cedar and larch, however, are common. Maple, birch, and white pine are scattered throughout the stands where the soil is less wet. Areas that are wetter have dense growths of alder.

The Burnham soils are the very poorly drained members of a group that includes the well-drained Bangor and Plaisted soils, the moderately well drained to somewhat poorly drained Dixmont and Howland soils, and the poorly drained Monarda soils—all from similar parent materials. The Burnham soils are also in areas where the coarse-textured Hermon soils, which developed from granitic till, are common.

All of the Burnham soils require drainage for pastures; otherwise they will stay wet most of the year. The soils, however, have moderately high fertility, and if adequately drained, they will produce good yields of small grains and grasses.

Only one Burnham soil—Burnham silt loam, 0 to 3 percent slopes—is mapped separately in the county. Burnham very stony silt loam and Burnham extremely stony silt loam are mapped as undifferentiated units with Monarda very stony silt loam and Monarda extremely stony silt loam, respectively. These undifferentiated units are described under the Monarda series.

Profile of Burnham silt loam with a 2 percent slope in a pasture.

- A_p 0 to 7 inches, dark grayish-brown (2.5Y 4/2) silt loam; strong, medium, granular structure; friable; strongly acid; 5 to 10 percent coarse fragments; abrupt, smooth lower boundary.
- C_{1g} 7 to 17 inches, strongly mottled, grayish-brown, yellow, and brown silt loam; weak, thick, platy structure; very firm and brittle; medium acid; 20 to 30 percent coarse fragments; clear, wavy lower boundary.
- C_{2g} 17 to 24 inches, mottled olive-gray and brown silt loam; weak, thick, platy structure; very firm; medium acid; 20 to 30 percent coarse fragments that include slate, shale, and phyllite; clear, wavy lower boundary.

C_{3g} 24 to 34 inches +, strongly mottled olive-gray, brown, and olive-yellow heavy silt loam; strong, thin to medium, platy structure; very hard; moderately sticky and plastic when wet; slightly acid; 30 to 40 percent coarse fragments; grades to slightly mottled, bluish-gray and brown glacial till of silty clay loam or silt loam.

The Burnham soils vary mostly in degree of mottling in the subsoil. Most areas also have from 5 to 12 inches of mucky or peaty material at the surface.

Burnham silt loam, 0 to 3 percent slopes (BrA).—This is a very deep, dark-gray soil that is mottled olive gray and olive yellow. It has developed from silty glacial till. It is nearly level and has very slow runoff. It may be ponded part of the year. This soil is more common in the southwestern wing of the county than elsewhere. The profile is similar to that described for the series.

Areas with a few, scattered outcrops and boulders are included with this soil. A few areas with slopes up to 8 percent are also included; they occur along the sides of till ridges. This soil is pastured where it is drained or is less wet than normal. It is not suited to potatoes, peas, beans, and orchards. (Capability unit Vw-3.)

Buxton Series

The Buxton soils are moderately well drained to somewhat poorly drained, slowly permeable, and very deep. They have formed from silt and clay deposits—mostly on fine-textured lacustrine or marine terraces in the southern part of the county. The surface layers are very dark grayish-brown to light brownish-gray silt loam. They are friable and have a strong, medium, granular structure. The subsoil is mottled yellowish-brown, pale-brown, and gray silt loam and silty clay loam. It is firm and has weak to strong, thin to medium, platy structure. Buxton soils are strongly to medium acid in the surface layers, and medium to slightly acid or neutral in the subsoil.

The native vegetation consisted of white pine, spruce, fir, larch, hemlock, and other softwoods. A large part of this soil now is pastured or in hay land.

The Buxton soils are in the same locations as the well-drained Suffield, poorly drained Scantic, and very poorly drained Biddeford soils—all developed from similar fine-textured deposits. They also occur next to the well-drained Melrose soils and moderately well drained Elmwood soils—both developed from fine sandy material over silt and clay.

The fine-textured Buxton soils must be plowed and cultivated when moisture conditions are right. If worked when wet, they have a tendency to form clods that are hard to break apart. Moderately large applications of complete fertilizer and some lime are enough for most crops, but the exact amounts should be determined by field tests and the needs of the crops grown.

One of the Buxton soils in the county—Buxton stony silt loam—is mapped as an undifferentiated unit with Scantic and Biddeford stony silt loams.

Profile of Buxton silt loam on a 2 percent slope in a pasture:

A_p 0 to 7 inches, very dark grayish-brown (2.5Y 3/2) silt loam; strong, medium, granular structure; friable; strongly acid; abrupt, smooth lower boundary.

B_{21} 7 to 10 inches, light yellowish-brown (2.5Y 6/4) silt loam; weak, medium, platy structure; firm; strongly acid; clear, wavy lower boundary.

B_{22g} 10 to 15 inches, light-gray (5Y 7/2) silt loam; mottles of pale brown and olive; weak, medium, platy structure; very firm; strongly acid; clear, wavy lower boundary.

B_{23g} 15 to 20 inches, very dark grayish-brown (2.5Y 3/2) silt loam that is strongly mottled with light gray; strong, thick, platy structure; very firm; medium acid; gradual, wavy lower boundary.

C_{1g} 20 to 25 inches, light olive-brown (2.5Y 5/4), heavy silt loam; mottles of pale gray and olive; strong, thick, platy structure; very firm; medium acid; gradual, wavy lower boundary.

A few, scattered pebbles occur throughout the profile.

Profile of Buxton silt loam on a 2 percent slope in a wooded area (note the thin, leached layer characteristic of this soil in wooded areas):

A_0 3 inches to 0, dark-brown, loamy mat of fibrous and loose organic materials from mixed conifers and maple.

A_1 0 to 2 inches, very dark grayish-brown (2.5Y 3/2) silt loam; strong, medium, granular structure; very friable; strongly acid; abrupt, smooth lower boundary.

A_2 2 to 3 inches, light brownish-gray (2.5Y 6/2) silt loam; moderately strong, medium, platy sturcture; soft; strongly acid; abrupt, irregular lower boundary.

B_{21} 3 to 7 inches, light yellowish-brown (2.5Y 6/4) silt loam; moderately strong, medium, platy structure; slightly firm; medium acid; clear, wavy lower boundary.

B_{22g} 7 to 11 inches, light-gray (5Y 7/2) silt loam; mottles of pale brown and olive; weak, medium, platy structure; firm; medium acid; clear, wavy lower boundary.

B_{23g} 11 to 16 inches, very dark grayish-brown (2.5Y 3/2) silt loam; mottles of light gray; strong, thick, platy structure; very firm; medium acid; gradual, wavy lower boundary.

C_{1g} 16 to 22 inches, light olive-brown (2.5Y 5/4) silty clay loam; mottles of pale gray and olive; strong, thick, platy structure; very firm; slightly acid; gradual, wavy lower boundary.

C_{2g} 22 to 24 inches +, mottled pale-gray and pale-olive silty clay loam; brown stains on surface of peds; strong, thick, platy structure; very firm; slightly acid.

The Buxton soils are not all so well developed in the sola (upper horizons) as the soils described in the profiles. Some profiles lack well-defined A_2 and B_2 layers and consist primarily of dark grayish-brown silt loam that grades into yellowish-brown and mottled dark-gray silty clay loam at a depth of 10 to 16 inches.

Buxton silt loam, 0 to 2 percent slopes (BuA).—This soil is grayish-brown to mottled olive and gray. It is nearly level and has very slow runoff. It is somewhat poorly drained internally and is slowly permeable to water. It has a profile similar to that of the soil described for the series in a pasture. The water-absorbing capacity is slow, but both the water-holding and water-supplying capacities are good.

This soil is well suited to pasture and hay (especially those containing clover and birdsfoot trefoil), forage crops, small grain, leafy vegetables, and small fruit. It is less well suited to beans and corn. It is either poorly suited or not suited to peas, orchards, and root vegetables. If worked when too wet, the soil forms clods that are difficult to break apart. (Capability unit IIw-7.)

Buxton silt loam, 2 to 8 percent slopes (BuB).—This soil is grayish brown to yellowish brown and mottled olive and gray. It is gently sloping and has medium runoff. It is moderately well drained internally and is slowly permeable. The profile is similar to that described for Buxton silt loam in a pasture. The water-absorbing ca-

pacity is slow, but both the water-holding and water-supplying capacities are good.

This soil is well suited to pasture and hay (especially those containing clover and birdsfoot trefoil), small grain, leafy vegetables, and small fruit. It is less well suited to beans and corn. It is generally too fine textured for root vegetables and too wet for potatoes, peas, and apples. If worked when wet, the soil clods and then dries into hard lumps that are difficult to break apart. It is moderately productive, but applications of complete fertilizer and some lime are needed for most crops. (Capability unit IIw–7.)

Buxton silt loam, 8 to 15 percent slopes (BuC).—This soil is dark grayish brown to yellowish brown and olive gray mottled with yellow. It has sloping relief and rapid runoff. It occurs along the margins of the sea and lake terraces in the southern part of the county. It has a profile similar to that described for Buxton silt loam in a pasture.

Included with this soil are areas with a few, scattered outcrops and boulders. Also included are small, scattered sandy knolls near the streams that dissect this soil.

Most of Buxton silt loam, 8 to 15 percent slopes, is in pasture or hay, to which it is well suited. Tilled areas of the soil will erode. If adequate conservation practices are used, the soil is suited to corn, beans, small grains, some forage crops, and leafy vegetables. It is not well enough drained for potatoes, root vegetables, and orchards.

The soil is moderately productive, and moderately heavy applications of complete fertilizer and lime are adequate for most crops. The soil will clod or puddle if handled when wet. It should therefore be tilled only when the moisture conditions are suitable. (Capability unit IIIew–7.)

Buxton, Scantic, and Biddeford stony silt loams, 0 to 8 percent slopes (BxB).—This undifferentiated unit occurs in depressions and on slight knolls that are part of large spruce-fir flats in the towns of Bradley, Orono, Alton, Old Town, and Milford. About half of each unit mapped consists of the poorly drained Biddeford stony silt loam, which occurs in long, narrow depressions. The other half is equally divided between the poorly drained Scantic stony silt loam and the moderately well drained to somewhat poorly drained Buxton stony silt loam. These soils occur on the knolls. The deep soil profiles of the Buxton, Scantic, and Biddeford soils in this unit are similar to the ones described for their respective series. The areas occupied by this unit, however, are generally somewhat poorly to very poorly drained and have many stones and boulders scattered over the surface. The stones are generally 10 to 18 inches in diameter. The underlying silt and clay material is nearly all stone free, but some gravel is mixed with it along the larger drainage streams.

A few areas with larger clumps of boulders and some spots of soil from stony or bouldery till are included with this mapping unit.

This undifferentiated unit is wooded and supports good stands of spruce, fir, white-cedar, hemlock, and white pine. It is too stony and wet to be cleared for crops or pasture, and the relief is too irregular for good drainage systems. The soil is best suited to the production of pulpwood because sawtimber is highly susceptible to windthrow. (Capability unit VIIsw–3.)

Canaan Series

The soils of the Canaan series are well-drained to somewhat excessively drained and are rapidly permeable to water. They have formed from a thin layer of granitic glacial till and residuum from acid granite or granitic rocks. They are all extremely acid to strongly acid and are very shallow or shallow. They are low in plant nutrients and are droughty. The surface soil is dark-brown to yellowish-brown loam or sandy loam and is loose or friable. The subsoil is yellow to light-gray sandy loam or coarse sandy loam. It is generally loose but is friable or firm in places.

The Canaan soils are extensive around the mountainous areas north of Millinocket and in the southeastern part of the eastern wing of the county near Lakeville and Whitney. They are also common around granite exposures east of Lincoln and near Clifton in the southeastern corner of the county.

These soils are mostly wooded. The native vegetation is northern hardwoods and white pine. Red and white oak are common. Birch, hard maple, and some spruce are mixed in the stands or are in nearly pure stands, depending on the depth of the soil to granitic bedrock.

The Canaan soils are shallow members of a group that includes the deep and well-drained Hermon soils from granitic till. They are in the same general area as the moderately well drained to somewhat poorly drained Howland, the poorly drained Monarda, and the very poorly drained Burnham soils. The Canaan soils are also in areas where well-drained Plaisted soils from mixed granitic and slaty till are common.

Profile of Canaan extremely rocky sandy loam on a 10 percent slope in a wooded area:

A_{00} 4 inches to 0, loose, brown accumulations of twigs and leaves from white pine and oak.

A_1 0 to 3 inches, black (10YR 2/1) sandy loam; strong, medium, crumb structure; very friable; extremely acid; 20 to 30 percent coarse fragments; abrupt, smooth lower boundary.

A_2 3 to 6 inches, light-gray (10YR 7/1) sandy loam; weak, fine, granular structure; loose; extremely acid; 20 to 30 percent coarse fragments; abrupt, irregular lower boundary.

B_{21} 6 to 8 inches, very dark grayish-brown (10YR 3/2) sandy loam (orterde); weak, fine, subangular blocky structure; friable to firm or hard (depending on cementation); very strongly acid; 20 to 30 percent coarse fragments; clear, irregular lower boundary.

B_{22} 8 to 12 inches, yellowish-brown (10YR 5/8) sandy loam; weak, fine, subangular blocky structure; very friable or friable; extremely acid; clear, wavy lower boundary.

B_3 12 to 18 inches, pale-brown (10YR 6/3) sandy loam; structureless; loose or very friable; strongly acid; 30 to 40 percent coarse fragments; clear, wavy lower boundary.

This profile is representative of those most common for the series. The coarse fragments in the Canaan soils are mostly granitic, except those around Horse Mountain, where they may be diorite or some other hard rock.

Canaan extremely rocky sandy loam, 5 to 15 percent slopes (CaC).—This dark grayish-brown to olive-gray soil is very shallow. It has rolling relief and medium runoff. It occurs on the sides and tops of the granitic ridges in the northern and southeastern corners of the county. It is common around Millinocket, Lakeville, and Clifton. The soil profile resembles that described for the series.

The soil has many bedrock outcrops and many boulders and stones on the surface (fig. 9).

Small, wet areas are included in depressions and in the hollows of the ridges.

Figure 9.—Area of Canaan extremely rocky sandy loam, 5 to 15 percent slopes.

This soil supports thin stands of spruce and mixed hardwoods, which are suitable for pulpwood. It is not so well suited to sawtimber, because the large trees are shallow rooted and blow over easily. Rock outcrops, boulders, and stones make construction of woodland roads difficult and hamper logging. (Capability unit VIIs–1.)

Canaan extremely rocky sandy loam, 15 to 45 percent slopes (CaE).—This soil is shallow and is hilly and very steep. It occurs on mountainsides in the northern and southeastern parts of the county near East Turner Mountain and Clifton. The soil profile resembles that described for the series.

Bare rockland and cobbly or gravelly knolls are included with this steep and hilly soil.

Canaan extremely rocky sandy loam, 15 to 45 percent slopes, supports thin stands of mixed northern hardwoods and white pine. The trees are best cut for pulpwood, since those of sawtimber size often blow over. Logging operations, road construction, and maintenance are hampered by boulders and rock outcrops. This soil is mainly used for woodland, recreation, or wildlife. (Capability unit VIIs–1.)

Colton Series

This series consists of excessively drained, very deep, sandy, gravelly, and cobbly soils. The surface layer consists of dark-brown and gray gravelly or cobbly loamy sand or sandy loam that is loose or very friable. The subsoil is brownish-yellow and yellow, cobbly and gravelly, loose sand to sandy loam (fig. 10). These soils formed from the coarsest glacial outwash. They occur throughout the county as long, winding, narrow horsebacks or eskers. In the Millinocket area, they also occur as knolls or kames and flat cobbly outwash or coarse sandy and gravelly outwash.

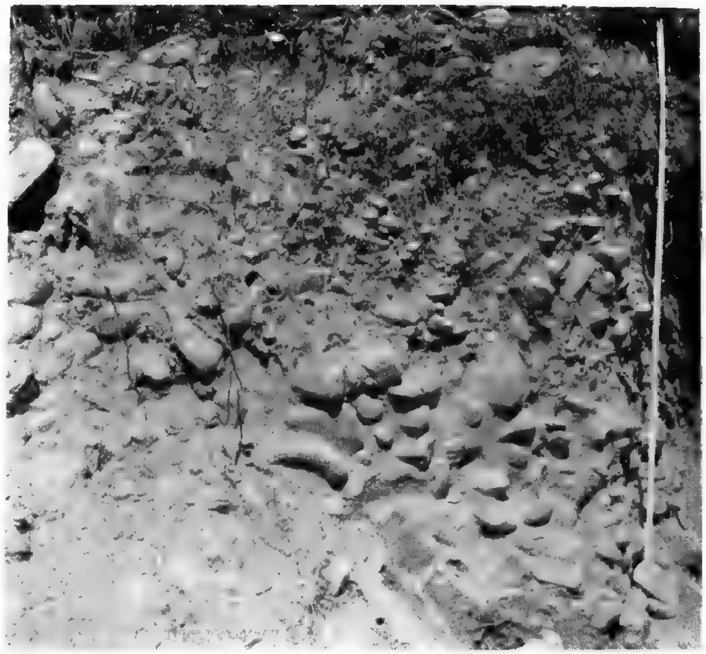

Figure 10.—Profile of Colton cobbly sandy loam, showing coarse fragments (80 to 90 percent).

Pine is the dominant native vegetation, but red spruce, maple, and birch also grow in the flat areas of these soils. The Colton soils are frequently adjacent to the well-drained Stetson, the moderately well drained Machias, and the poorly drained Red Hook and Atherton soils—all on less coarse glacial outwash. They also occur next to peats and mucks in areas where eskers have impounded glacial lakes and ponds. The Colton soils are generally too dry for most crops. The areas with the least coarse textured soil, however, may be used for crops.

Profile of Colton cobbly sandy loam, dark materials, on a 25 percent slope in an area of virgin forest:

A_{00} and A_0 3 inches to 0, brown, loamy mixture of loose and fibrous pine needles and twigs; extremely acid; abrupt, smooth lower boundary.

A_1 0 to 2 inches, very dark grayish-brown (10YR 3/2) gravelly sandy loam; weak, coarse, granular structure; very friable; extremely acid; 50 to 60 percent coarse fragments; abrupt, smooth lower boundary.

A_2 2 to 3 inches, light-gray (10YR 7/1) gravelly sandy loam; weak, coarse, granular structure; very friable; extremely acid; 50 to 60 percent coarse fragments; abrupt, irregular lower boundary.

B_{21} 3 to 7 inches, strong-brown (7.5YR 5/6) gravelly sandy loam; weak, medium, granular structure; friable; very strongly acid; 50 to 60 percent coarse fragments; abrupt, irregular lower boundary.

B_{22} 7 to 16 inches, strong-brown (7.5YR 5/8) cobbly sandy loam; weak, medium, granular structure; friable; very strongly acid; 60 to 70 percent coarse fragments; clear, wavy lower boundary.

B_3 16 to 22 inches, yellowish-brown (10YR 5/8) cobbly sandy loam; very weak, fine, granular structure; very friable; strongly acid; 70 to 80 percent coarse fragments; gradual, wavy lower boundary.

C_1 22 to 32 inches, yellow (10YR 7/6), cobbly, coarse loamy sand; structureless; loose; 60 to 70 percent coarse fragments; strongly acid; gradual, wavy lower boundary.

C_2 32 to 42 inches, light yellowish-brown (10YR 6/4), cobbly coarse sand; structureless; loose; 60 to 70 percent coarse fragments; strongly acid; clear, wavy lower boundary.

D 42 to 150 inches +, gravel, cobblestones, and sand stained brown, olive, and gray; structureless but the materials are water sorted and stratified; loose and firm layers in place; medium to slightly acid; 80 to 90 percent coarse fragments.

The Colton soils range from coarse gravelly sand to sandy loam in texture. The average profile is sandy loam. The coarse fragments are frequently fine gravel throughout the profile. They become coarser near the mountains north of Millinocket, however, and may be cobblestones, 5 to 7 inches in diameter, and boulders, 4 to 5 feet in diameter.

The upper layers in all of the Colton soils are extremely acid, but some of the lower substrata have secondary lime deposits on the gravel and cobblestones. If the soils are tilled, they will need heavy applications of lime to correct the acidity of the surface layer. Most of them are low in plant nutrients and droughty, and therefore practically all are left in woods. The water-absorbing capacity is very rapid; both the water-holding and water-supplying capacities are poor.

Colton cobbly sandy loam, dark materials, 0 to 8 percent slopes (CcB).—This soil has a profile similar to that described for the series. The soil is nearly level to undulating, excessively drained, and relatively inextensive. It occurs on the top of the winding and extremely long horsebacks crossing the county at various places—particularly in the Millinocket and Clifton areas where the coarse sandy and cobbly materials are most prevalent. It also occurs in a few other places as cobbly and bouldery kames or flat outwash near glacial ponds.

Some areas with other textures are included; however, these included areas do not have a texture finer than fine sandy loam. A few moderately well drained spots are also included.

This soil is best suited to red and white pine and red spruce. Because of dryness, it is not suitable for many crops and is poorly suited to many of the common trees in the area. Most of the soil is now in pine and scattered aspen, oak, maple, and red spruce. (Capability unit IIIs-5.)

Colton cobbly sandy loam, dark materials, 8 to 15 percent slopes (CcC).—This soil has a profile similar to that described for the series. Although rolling, the soil has such rapid absorption that runoff is negligible. It is more extensive than Colton cobbly sandy loam on slopes of 0 to 8 percent. It occurs along the sides of the horsebacks and terrace escarpments on some of the coarsest glacial outwash, mostly near Millinocket and Clifton and in other parts of the county wherever the outwash is coarser than usual.

Included with this soil are a few very stony or bouldery areas near the mountains north of Millinocket.

Colton cobbly sandy loam, dark materials, 8 to 15 percent slopes, is best suited to pine and red spruce. It supports good stands of white pine that include mixtures of red pine, red spruce, oak, maple, and aspen. It is probably better for sawtimber than for pulpwood because of the slow rate of tree regrowth. Selective cutting that maintains some sort of a forest cover will help preserve soil moisture. Soil moisture is normally so low that the soil cannot be used for crops. (Capability unit IVs-5.)

Colton cobbly sandy loam, dark materials, 15 to 25 percent slopes (CcD).—This soil has a profile similar to that described for the series. Although hilly, the soil has little or no runoff because of the rapid rate of absorption. It occurs along the sides of the steep and very high horsebacks and eskers near Millinocket, Seboeis, and Alton. It also occurs on the terrace escarpments that were formed from coarse glacial outwash in various places.

This soil is generally very deep, but some areas with rock outcrops are included near the county line in La Grange and along the Penobscot River in Enfield. These areas occur where gravel pits have played out. Also included are many areas of loamy sand and cobbly fine sand.

This soil is also well suited to pine and red spruce. It supports good stands of white pine that include mixtures of red pine, red spruce, oak, maple, and aspen. Selective cutting for sawtimber is more desirable on this soil than cutting for pulpwood because regrowth of trees is slow. This soil is entirely too steep and too dry for most crops. (Capability unit VIIs-5.)

Colton cobbly sandy loam, dark materials, 25 to 45 percent slopes (CcE).—Although the absorption rate is rapid, this steep and very steep soil has some runoff. In many places the upper part of the soil profile is thinner than that described for the series. This soil occurs along the high, very steep banks of the eskers and terrace escarpments. In many places it borders areas of peat, muck, and similar areas where water is ponded. This soil occurs along most of the principal drainage basins throughout the county. Good examples are in the towns of Alton, Seboeis, and Millinocket.

This is a forest soil and should be kept in pine, oak, and red spruce. The deep-rooted trees can reach the low water table. They are able to get nutrients from the finer fractions in the upper layers and from the ground water. (Capability unit VIIs-5.)

Colton gravelly sandy loam, dark materials, 0 to 2 percent slopes (CnA).—This is a somewhat excessively drained, very deep soil that developed from glacial outwash. It is nearly level and absorbs almost all rainfall. The surface layer is yellowish-brown gravelly sandy loam. Coarse fragments, mostly fine gravel that is less than 2 inches in diameter, make up 10 to 20 percent of this layer. In wooded areas a light-gray, leached layer of sandy loam, 1 or 2 inches thick, underlies a loose, brown, fibrous mat of forest litter, 2 or 3 inches thick. The subsoil is yellowish-brown to light olive-brown gravelly sandy loam. It is structureless. Coarse fragments, mostly gravel less than 3 inches in diameter, make up 50 to 70 percent of the subsoil. Except as noted, the profile is like the one described for the series.

This soil occurs only on the tops of eskers and flat glacial terraces along the Penobscot River basin. It is primarily in or near the towns of Carmel, Levant, La Grange, and Alton, in areas where the outwash material is noticeably gravelly.

Small, moderately well drained spots and occasional boulders are included with this soil.

This Colton gravelly sandy loam is mostly wooded. A few acres have been cleared and are idle or in pasture. This soil supports good stands of red and white pine, red spruce, some larch, maple, aspen, and birch. Both sawtimber and pulpwood are cut, but the soil is better suited to sawtimber. The trees root deeply and do not easily

blow over. They also reseed and grow rapidly if fire is prevented.

This soil is very droughty and is very low in fertility. It is best suited to forestry, but it can be cleared and used for most crops grown in the area except apples. Apples can be grown, however, where there is enough air drainage. Blueberries are well suited. (Capability unit IIs–5.)

Colton gravelly sandy loam, dark materials, 2 to 8 percent slopes (CnB).—This soil has a surface soil similar to that of Colton gravelly sandy loam, dark materials, 0 to 2 percent slopes. The underlying layers in wooded areas are also similar (fig 11). This undulating soil has

Figure 11.—Profile of Colton gravelly sandy loam, dark materials, 2 to 8 percent slopes. Fine gravel and coarse fragments make up about 30 to 40 percent of the profile.

negligible runoff. It is prevalent along the winding eskers that cross the county in many places. It also commonly occurs on the margins of glacial terraces where the escarpments begin. These areas are in the southwestern and central parts of the county, generally along the valleys of the Kenduskeag and Penobscot Rivers.

Small, moderately well drained and poorly drained spots are included.

This undulating soil is mostly wooded. It supports good stands of red and white pine, spruce, aspen, and birch. Along the margins of areas of this soil, where the forest growth differs, some scattered maple and other trees occur. This soil produces both sawtimber and pulpwood, but it is better suited to sawtimber. The trees become deep rooted and do not blow over easily. They also reseed and grow rapidly if fire is kept out of the woods.

Some of this soil is also cleared and is suited to nearly all the tilled crops and berries grown in this section. Blueberries grow well. Apples can be produced where there is enough air drainage. The soil is not as well suited to pastures and hay as to tilled crops and berries, as it is quite droughty. The fertility is low, and on some of the more gravelly areas, seeding is irregular.

Two or three applications of fertilizer are needed on this rapidly permeable soil for best results. Nitrogen, especially, is required in amounts determined by soil tests and by the needs of the crops grown. (Capability unit IIs–5.)

Colton gravelly sandy loam, dark materials, 8 to 15 percent slopes (CnC).—This soil is similar to Colton gravelly sandy loam, dark materials, 0 to 2 percent slopes. It is somewhat excessively drained and very deep. It has formed from gravelly glacial outwash. It has rolling relief but has very little runoff because most of the rainfall is absorbed. This soil occurs on the winding eskers (or horsebacks) that cross the county in many places. It is also along the edges of the outwash terraces where the escarpments begin. These areas are in the southwestern and central parts of the county, generally along the valleys of the Kenduskeag and Penobscot Rivers. A few areas of this soil are gravelly terraces near the lakes.

Small bouldery areas and areas with occasional outcrops are included with this soil.

This rolling Colton gravelly sandy loam is wooded and supports good stands of white and red pine, spruce, aspen, and birch. Maple and other species are scattered along the margins of areas of this soil, where the forest growth differs. Both sawtimber and pulpwood are cut, but the soil is better suited to sawtimber. The trees are deep rooted and less likely to blow over on this soil than on the wet soils of the spruce-fir flats. Pine reseeds and grows rapidly.

This soil generally is not cleared. The common crops of the vicinity, as well as berries and grass, are grown, even though the soil is droughty and relatively infertile. Irrigation and adequate amounts of lime and complete fertilizer are required for good yields. Nitrogen is especially needed. Two or three applications during the growing season are more suitable than one large application. (Capability unit IIIes–5.)

Colton gravelly sandy loam, dark materials, 15 to 25 percent slopes (CnD).—This soil is similar to Colton gravelly sandy loam, dark materials, 0 to 2 percent slopes. It has a moderately steep relief, however, but because rainfall is rapidly absorbed, runoff is only moderate. The soil is mostly part of the steeper winding eskers (or horsebacks) in the Alton-LaGrange area and near Enfield and Lowell. It is also on part of the escarpments that mark the ends of the glacial outwash terraces in the valleys of the Kenduskeag and Penobscot Rivers.

Areas of rock outcrop and bouldery knolls are included with this soil.

Nearly all of this hilly Colton gravelly sandy loam is wooded and supports good stands of pine and some spruce. Maple, aspen, and birch are also mixed with the pine in places. Both sawtimber and pulpwood are cut. The soil is well suited to pine plantations, as the trees become

deeply rooted and will not easily blow over. The soil is generally too dry and steep for most tilled crops and too dry for grasses. The soil is also low in fertility and would require heavy applications of complete fertilizer, lime, and additional nitrogen for good yields. (Capability unit IVes-5.)

Colton gravelly sandy loam, dark materials, 25 to 45 percent slopes (CnE).—The profile of this soil is similar to that described for the series, except that the coarse material is mostly gravel less than 3 inches in diameter. The soil is steep and has rapid runoff. It makes up part of the high and gravelly eskers in the towns of Alton, LaGrange, and Enfield and the steep escarpments of glacial terraces in the central part and central-eastern wing of the county. It also occurs along the sides of streams that are entrenched in the outwash.

Areas of bedrock outcrop and bouldery knolls are included with this soil. Small areas of peat and muck in potholes and similar small depressions that are surrounded by this soil are also included.

Nearly all of this steep Colton gravelly sandy loam is wooded. It supports good pine stands in many places; mixed maple, pine, spruce, aspen, and birch occur in some areas. Trees suitable for pulp grow slowly on these soils. Those that grow best—white and red pine—are not suitable for this use. The soil is therefore best for sawtimber. Lumber roads on these slopes are usually unstable, but the timber can be reached by draglines and from more level areas nearby. (Capability unit VIIes-5.)

Colton loamy fine sand, dark materials, 0 to 2 percent slopes (CsA).—The surface layer of this soil is dark-brown to yellowish-brown loamy fine sand to a depth of about 3 inches. To a considerable depth, the subsurface layer is loamy sand, sand, and stratified sand and gravel that are speckled black and gray. In places the substratum consists of stratified cobblestones and gravel. The coarse fragments in the upper layers make up less than 5 percent of the volume, but those in the lower subsoil and the substratum make up from 10 to 80 percent. The proportion of coarse fragments in the lower subsoil and substratum increases with depth, except where strata of coarse and medium sand occur. The consistence ranges from very friable and friable in the upper layers to loose in the subsoil, and from loose to firm in the stratified materials. The soil is generally structureless except in the surface layers, which have weak, fine, granular and medium, granular structure.

This soil occurs primarily on the postglacial terraces of the valley of the Penobscot River. It also occurs in a few other areas of glacial outwash.

Included with this soil are seepage areas, less than 2 acres in size, and some areas with finer texture.

This soil is suited to nearly all the crops, including small grains and small fruits, grown in the county. It is less well suited to hay and pasture because of its coarse texture. These crops, however, are suited to the included areas with finer texture. This soil is not suited to orchards because it is nearly level and lacks air drainage.

This loamy fine sand is droughty, very strongly acid, and low in fertility. Heavy applications of complete fertilizer and additional side dressings of nitrogen, as well as irrigation, are needed for good yields. Lime is also needed to correct the acidity. (Capability unit IIIs-5.)

Colton loamy fine sand, dark materials, 2 to 8 percent slopes (CsB).—This is a very deep, somewhat excessively drained, sandy soil of the river terrace. It is similar to the nearly level Colton loamy fine sand. Although gently sloping, it has very little runoff because it absorbs rainfall rapidly.

Small, finer textured areas and gravelly knolls near the rivers are included with this soil. Also included are areas north of Orono and in other localities where bedrock outcrops along the margins of the uplands and terraces. These are indicated on the map by symbol.

When adequately limed and fertilized, this gently sloping soil is suited to most crops, including small fruits and grains. Some wooded areas of the central Penobscot basin support good stands of white pine and mixed conifers and hardwoods. Plantations of white pine are suited to this soil, but other trees are injured by drought. Lumbering operations are hampered in a few places where the loamy fine sand is deeper and looser than usual. This soil is well suited to tree nurseries, but it not suited to orchards, because of the lack of air drainage. The soil is droughty; irrigation as well as amendments are required for good yields. (Capability unit IIIs-5.)

Colton loamy fine sand, dark materials, 8 to 15 percent slopes (CsC).—This soil is similar to Colton gravelly sandy loam, dark materials, 0 to 2 percent slopes. It has sloping relief, but only slow or negligible runoff, because the rainfall is rapidly absorbed. Its water-holding capacity and water-supplying capacity are only fair. The soil occurs mostly on terrace escarpments along the Penobscot River in the towns of Enfield, Howland, and Passadumkeag.

Near the streams, areas with scattered outcrops, a few boulders, and cobbly knolls are included with this soil.

This sloping soil is suited to most crops, including small fruits and grains. It is also suited to orchards if sufficiently irrigated, limed, and fertilized. The soil is mostly in woods and supports good stands of white pine and other trees. A small acreage is in pasture and is included in fields with better soils. (Capability unit IVs-5.)

Colton loamy fine sand, dark materials, 15 to 25 percent slopes (CsD).—This soil is also similar to the nearly level Colton loamy fine sand. It is sandy, very deep, and somewhat excessively drained. It occurs primarily on the faces of terrace escarpments in the valley of the Penobscot River. Most areas are moderately steep but have only medium runoff because the rainfall is rapidly absorbed.

Near the margins of this soil or near streams, areas with scattered outcrops, a few boulders, and cobbly knolls are included.

This moderately steep soil is best suited to trees. It supports good stands of white pine, hemlock, spruce, maple, aspen, and white birch. In places a few oak trees are scattered through the groves. The soil is generally too steep and droughty for crops. (Capability unit VIIs-5.)

Daigle Series

The soils of the Daigle series are deep, somewhat poorly drained, and silty throughout most of the profile. They have formed from brown glacial till that is very firm and includes many slivers of limy rock. The silt loam surface

soil is dark brown to yellowish red and friable to firm. The clay loam to silty clay loam of the subsoil is mottled strong brown, grayish brown, and olive brown. It is firm to very firm. The surface soil is strongly acid, and the subsoil is medium to slightly acid. The substrata may be weakly calcareous. Permeability to water is moderately rapid in the surface soil and moderately slow in the subsoil.

The Daigle soils occur on broad-topped and long-sloping ridges around Patten and Stacyville in the northern end of the county.

The native vegetation consists of mixed softwoods; spruce and fir predominate. Some other trees are white-cedar and pine, maple, poplar, and yellow birch. A large part of the acreage of these soils is wooded.

Soils near the Daigle are the Thorndike, which are shallow to bedrock, the Perham, which are deep and well drained, the Monarda, which are poorly drained, and the Burnham, which are very poorly drained. The Daigle soils are similar to the silty Dixmont soils but differ in having a browner till and in having more silt and clay in the subsoil.

The soils of the Daigle series are not excessively stony, even in woods. Consequently, they can be readily cleared for pasture or crops. These soils have a good water-holding capacity and a good water-supplying capacity. The supply of nutrients, except nitrogen, is medium. Nitrogen must be supplied for all crops. Lime is also needed because the surface soil is generally strongly acid. Some crops will need phosphate and potash.

Representative profile of Daigle silt loam, 2 to 8 percent slopes, in a cultivated area:

A_p 0 to 8 inches, dark grayish-brown (10YR 4/2, moist) silt loam; moderate, medium, granular structure; friable; 15 to 20 percent coarse fragments; pH 5.2; abrupt lower boundary. 7 to 10 inches thick.

B_{2g} 8 to 11 inches, dark-brown (10YR 4/3) silt loam with few, fine, distinct, grayish-brown (10YR 5/2) and yellowish-brown (10YR 5/6) mottles; weak, medium, granular structure; friable; 20 to 30 percent coarse fragments; pH 5.5; clear, wavy lower boundary. 2 to 8 inches thick.

A'_{2g} 11 to 16 inches, grayish-brown (2.5Y 5/2) silt loam with many, medium, grayish-brown (10YR 5/2) and dark grayish-brown (10YR 4/2) mottles; weak, thin, platy structure breaking to weak, fine, subangular blocky; firm; thin silt and clay films on tops of plates; 20 to 30 percent coarse fragments; pH 5.2; clear, wavy lower boundary. 2 to 10 inches thick.

B'_{21gm} 16 to 23 inches, very dark grayish-brown (10YR 3/4) clay loam with fine, grayish-brown (2.5Y 5/2) mottles that comprise the interior of prisms that are 8 to 12 inches in diameter; prism faces have grayish-brown (2.5Y 6/2) loam coatings that are bordered by dark yellowish-brown (10YR 4/4) prisms made up of moderate, medium, subangular blocky peds; very firm and brittle; silt and clay films on tops and sides of peds; peds and pores stained with dark-brown material (organic matter or manganese oxide?); 20 to 30 percent coarse fragments; pH 5.9; clear, wavy lower boundary. 6 to 10 inches thick.

B'_{22g} 23 to 39 inches, dark-brown (10YR 4/3) silty clay with few, fine, grayish-brown (2.5Y 5/2) mottles; moderate, fine, subangular blocky structure; very firm; few, thin silt and clay films around pores; 35 to 40 percent coarse fragments; pH 6.5; clear, wavy lower boundary. 10 to 20 inches thick.

C 39 to 46 inches, dark-brown (10YR 4/3) silt loam with few, fine, grayish-brown (2.5Y 5/2) mottles; moderate, fine, subangular blocky structure; very firm when moist, sticky when wet; 30 to 40 percent coarse fragments; pH 6.8.

The Daigle soils vary in the amount of coarse fragments in the glacial till and in the firmness of the till itself. Some areas are more slaty or shaly than others and are less firm in the substratum, especially where they are transitional to friable soils. A more pronounced platy structure also occurs in some areas.

Daigle silt loam, 0 to 2 percent slopes (DaA).—This dark-brown to grayish-brown soil has a profile similar to that described for the series. It is nearly level, and consequently runoff is slow. This soil occurs on the broad tops of deep glacial-till ridges around Patten and Stacyville.

This soil is well suited to pasture and hay. It is also well suited to cane fruits and oats. It is wet in spring when frost leaves the ground and late in fall if rains are frequent. It needs drainage for tilled crops and is generally too wet for orchards. Most of this soil is in woods or pasture. Both sawtimber and pulpwood grow rapidly and can easily be removed. Woods roads are wet during spring but can be used most of the year. (Capability unit IIw–4.)

Daigle silt loam, 2 to 8 percent slopes (DaB).—This dark-brown to grayish-brown soil has a profile similar to that described for the series. It is gently sloping and runoff is medium. It occurs along the sides of broad-topped, deep glacial-till ridges around Patten and Stacyville. It is extensive in this area, although the total acreage in the county is small.

The soil is best suited to pasture and hay. Oats and potatoes, beans, and other vegetables are grown. The soil is not well suited to orchards. Drainage is usually required for the best yields, particularly when the soil is wet in spring.

Complete fertilizers high in nitrogen are needed for most crops. Lime is also generally needed because the surface soil is strongly acid.

Most of this soil is wooded, but much of it was cleared and cultivated at one time. A considerable acreage is in pasture, and a smaller acreage is now in potatoes, oats, or other tilled crops. Both sawtimber and pulpwood grow rapidly and are easily harvested. Because of the stronger slope, roads are better drained than on the nearly level Daigle silt loam. (Capability unit IIw–4.)

Daigle silt loam, 8 to 15 percent slopes (DaC).—This dark-brown to grayish-brown soil has a profile similar to the one described for the series. It may, however, have a thinner surface layer where runoff has been active. It is sloping and the runoff is rapid. It occurs on the sides of broad-topped, deep glacial-till ridges around Patten and Stacyville and is somewhat extensive in these areas.

This sloping soil is well suited to the same crops as Daigle silt loam, 2 to 8 percent slopes. Most of it is in woods or pasture. Only a small part is cultivated, and this is mostly in potatoes. Some oats, cane fruits, and hay are grown on this soil. The rapid saturation of the soil after spring thaws and rains, combined with rapid runoff, causes rill erosion. Erosion control is needed if tilled crops are grown.

Both sawtimber and pulpwood do well and are readily lumbered. Spring freshets may sometimes wash out a woods road where the slopes are long. Ordinarily, the roads can be maintained without difficulty. (Capability unit IIIew–4.)

Daigle stony silt loam, 0 to 2 percent slopes (DgA).—Except for the upper layers, this soil has a profile similar to that described for the series. These upper layers are as follows:

A_0 and A_{00} 6 inches to 0, loose surface litter of twigs, leaves, and coniferous needles about 4 inches thick, underlain by decomposed and firm mat of organic material about 2 inches thick.

A_1 0 to 2 inches, black (10YR 2/1) silt loam; strong, medium, granular structure; very friable; very strongly acid; abrupt, smooth lower boundary.

A_2 2 to 3 inches, pinkish-gray (5YR 6/2) silt loam; weak, thin, platy structure; very friable; very strongly acid; abrupt, irregular lower boundary.

B_{21} 3 to 5 inches, dark-brown (7.5YR 3/2) silt loam; weak, fine, subangular blocky structure; firm; very strongly acid; abrupt, wavy lower boundary.

B_{22} 5 to 8 inches, strong-brown (7.5YR 5/6) silt loam; weak, medium, subangular blocky structure; firm; very strongly acid; clear, wavy lower boundary; roots are concentrated in the above horizons and thin out rapidly below this horizon.

This soil occurs mostly on top of the broad glacial-till ridges near Patten and Stacyville. It has formed from glacial till that consisted of slightly mottled, light olive-brown, gray, and yellow silty clay loam. Both the runoff and the water-absorbing capacity are slow. The water-holding capacity and water-supplying capacity are good. This soil has a moderate amount of stones. Only a few scattered stones are larger than 2 feet in diameter; the rest are much smaller.

This soil is wet when the ground thaws in spring and when there are frequent rains late in fall. Drainage is needed for row crops. Nearly all of this soil is wooded and supports good stands of mixed northern hardwoods and softwoods—primarily maple, birch, spruce, and fir. Both sawtimber and pulpwood can easily be cut. Except during wet springs, most roads can be traveled without difficulty. (Capability unit IVes–4.)

Daigle stony silt loam, 2 to 8 percent slopes (DgB).—This stony soil has a profile similar to that described for Daigle stony silt loam, 0 to 2 percent slopes. It is gently sloping and has medium runoff. It occurs on broad-topped, deep glacial-till ridges near Patten and Stacyville. It has a moderate amount of stones; only a few of them are larger than 2 feet in diameter. The rest are fragments of limy rock and quartzite about a foot in diameter.

Areas with scattered bedrock outcrops and a few that are poorly drained are included with this soil.

Daigle stony silt loam, 2 to 8 percent slopes, is wooded and supports good stands of mixed northern hardwoods and softwoods—primarily spruce, fir, maple, and birch. It is suited to pasture, hay, grain, and an occasional row crop. It is also well suited to the production of sawtimber and pulpwood. Tree growth is rapid. Lumbering is easily managed in this soil, and roads are generally passable. (Capability unit IVes–4.)

Daigle stony silt loam, 8 to 15 percent slopes (DgC).—This soil has a profile similar to that described for Daigle stony silt loam, 0 to 2 percent slopes. It is sloping and has rapid runoff. It occurs on the sides of broad-topped, deep glacial-till ridges. The amount of stones is about the same as on Daigle stony silt loam, 2 to 8 percent slopes.

Small areas of the Plaisted and Perham stony soils are included with this soil.

This soil is well suited to the production of pulpwood and sawtimber. The stands of trees are good. Pasture, hay, grain, and an occasional row crop are suitable. Some protection against erosion would be needed for row crops. Lumbering is not difficult on this soil. Freshets, however, tend to wash out woods roads on long slopes. Washouts can be reduced by building the roads on the least steep gradients. (Capability unit IVes–4.)

Dixmont Series

The soils of the Dixmont series are deep and moderately well drained to somewhat poorly drained. They have formed from very firm, dark olive-gray glacial till that includes many slivers of lime-seamed phyllite, slate, shale, and calcareous quartzite. The surface soil is dark yellowish-brown, friable silt loam with strong, medium, granular structure. The subsoil is heavy silt loam that is mottled olive brown, yellow, and brown. It is firm or very firm and has moderately strong, thin to thick, platy structure. The surface soil is strongly acid, and the subsoil is medium to slightly acid.

These soils of the upland are extensive and occur over the southwestern and central-eastern wings of the county. The native vegetation is mainly spruce, fir, white-cedar, and hemlock. Some white pine, maple, and yellow birch are included.

The Dixmont soils are in areas where the well-drained Bangor, the shallow Thorndike, the poorly drained Monarda, and the very poorly drained Burnham silty soils are also extensive. The Dixmont soils are similar to the Daigle soils, but they have an olive instead of a dark-brown substratum and contain more coarse fragments of lime-seamed rock. The Dixmont soils differ from the Howland soils in having a finer texture and more limy rocks in the parent material. They also have a firmer consistence.

The Dixmont soils are only moderately productive. They are strongly acid. Both phosphate and potash are needed, according to field tests. All nutrients are needed for most crops. Lime and nutrients should be added according to the needs of the crop grown. Both the water-holding capacity and the water-supplying capacity are good. Most tilled areas respond to drainage.

Profile of Dixmont silt loam on a 2 percent slope in a pasture:

A_p 0 to 7 inches, dark yellowish-brown (10YR 4/4) silt loam; weak, medium, granular structure; very friable; strongly acid; 10 to 20 percent coarse fragments; abrupt, smooth lower boundary.

B_{21} 7 to 9 inches, yellowish-brown (10YR 5/6) silt loam; weak, medium, platy structure; friable; medium acid; 10 to 20 percent coarse fragments; clear, discontinuous lower boundary.

B_{22gm} 9 to 15 inches, pale-olive (5Y 6/4) silt loam with a few faint mottles of olive brown (2.5Y 4/4); moderately strong, medium, platy structure; firm; medium acid; 10 to 20 percent coarse fragments; clear, wavy lower boundary.

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B_{23gm} 15 to 23 inches, silt loam, strongly mottled light olive brown (2.5Y 5/4), light olive gray (5Y 6/2), and light brownish gray (2.5Y 6/2); strong, medium, platy structure; very firm; slightly acid; 10 to 20 percent coarse fragments; gradual, wavy lower boundary.

B_{31gm} 23 to 37 inches, light olive-gray (5Y 6/2), heavy silt loam with many fine mottles of light olive brown (2.5Y 5/4) and brownish yellow (10YR 6/6); strong, medium, platy structure; very firm; slightly acid; 20 to 30 percent coarse fragments; clear, wavy lower boundary.

B_{32gm} 37 to 50 inches, dark yellowish-brown (10YR 4/4) silt loam with a few mottles of yellowish brown (10YR 5/4); moderately strong, medium, platy structure; very firm; neutral; 30 to 40 percent coarse fragments; diffuse, wavy lower boundary.

C 50 to 56 inches +, olive-brown (2.5Y 4/4) silt loam; weak, medium, platy structure; very firm; mildly alkaline; 30 to 40 percent coarse fragments; diffuse, wavy lower boundary; this layer grades to an olive-gray, firm, gravelly (slaty) glacial till.

The Dixmont silty soils vary in degree of acidity. Some areas are more acid than others to a greater depth in the profile. The coarse fragments also vary. They may be nearly all slate or lime-seamed phyllite and shale, or they may contain a considerable proportion of quartzite and fine-grained sandstone. The drainage and the mottled olive colors are fairly uniform, except in the extreme northern areas. Here some of the till has a darker brown color.

Dixmont silt loam, 0 to 2 percent slopes (DxA).—This soil has a profile similar to that described for the series. It is a dark yellowish-brown soil that is mottled olive brown and gray. It is nearly level and has slow runoff. Most areas are moderately well drained. This soil occurs on the tops of long, broad, deep glacial-till ridges in the southwestern and central-eastern wings of the county. It is particularly extensive around Corinna and Newport.

Included with this soil are small spots of poorly drained and very poorly drained Monarda and Burnham silt loams.

About half of this nearly level soil is in crops and the rest is in pasture or forest. It is best suited to pasture and hay. If tilled, the soil is also suited to potatoes, beans, small grains, and small fruits. Drainage is needed if tilled crops are grown. The soil is too wet for orchards or for any crops needing good drainage. Good stands of spruce and fir are common.

Complete fertilizer and lime are required for good yields on this soil. Amounts applied depend on the needs of the crops and the past use of the fields. (Capability unit IIw–4.)

Dixmont silt loam, 2 to 8 percent slopes (DxB).—Most of this soil has a profile similar to that described for the series. The soil is gently sloping and has medium runoff. It is moderately well drained. It occurs along the tops of long, broad, and deep glacial-till ridges in the southwestern and central-eastern wings of the county. It is extensive around Newport, Dexter, Corinna, and Exeter and near Lee and Drew.

Areas with occasional outcrops of bedrock and some with a few well-drained knolls of Bangor silt loam are included with this soil, as well as some poorly drained areas of Monarda silt loam.

More than half of this gently sloping soil is in crops or is idle; the rest is about equally divided between pasture and forest. This soil is well suited to pasture and to hay or forage crops. It is also suited to the crops commonly grown in the area—corn, potatoes, and beans. Oats and other small grain and small fruits are grown where the soil is somewhat poorly drained. The soil is poorly suited to orchards unless it is drained. Nearly all the areas benefit from drainage. Diversion ditches are frequently used to turn aside water that would keep the soil wet. Good stands of spruce, fir, white-cedar, and pine are numerous on this soil.

Applications of complete fertilizer and lime are needed for crops. Amounts are determined by tests and by the needs of the crops grown. (Capability unit IIw–4.)

Dixmont silt loam, 8 to 15 percent slopes (DxC).—This is a grayish-brown soil that is mottled olive brown and gray. It has a profile similar to that described for the series (fig. 12). It is sloping and has rapid runoff. Most areas are moderately well drained. This soil occurs on the sides of long and deep, broad-topped glacial-till ridges in the southwestern and central-eastern wings of the county. It is extensive in the towns of Corinna, Newport, and Exeter, and in the towns of Prentiss, Lee, and Carroll.

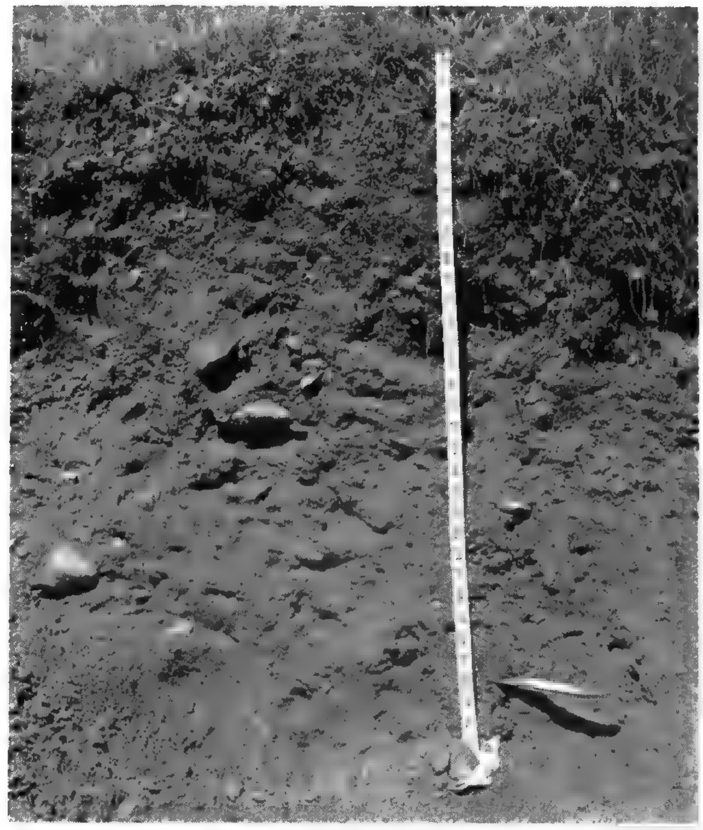

Figure 12.—**Profile of Dixmont silt loam, 8 to 15 percent slopes, showing coarse fragments and platy structure in lower part. The knife is in a "ghost," or rotten stone.**

Included with this soil are knolls or hill crests occupied by Bangor silt loam and areas with scattered bedrock outcrops. A few springs and seepage areas may occur near the base of slopes or where the slope gradient changes.

Most of this sloping soil is in crops; a small part is in pasture or forest. This soil is well suited to small grain and forage crops. It is also suited to potatoes, beans,

corn, and small fruits. Where drainage is installed, the soil is also suited to peas, other garden or special crops, and apples. Drainage is a problem in the somewhat poorly drained areas of this soil. Applications of lime and of a complete fertilizer that is high in nitrogen are needed for nearly all the crops.

This soil has many good stands of mixed northern softwoods, such as spruce, fir, white-cedar, and pine. On areas that are a little better drained, maple, beech, ash, and birch are also in the stands. (Capability unit IIIew-4.)

Dixmont very stony silt loam, 0 to 2 percent slopes (DyA).—The profile of this soil is similar to that described for the series, except that the upper layers have not been mixed by plowing. It is moderately well drained to somewhat poorly drained. The soil is nearly level, has slow runoff, and is usually damp much of the year. Small, scattered stones, as well as boulders about a foot in diameter, are on the surface. They are from lime-seamed slate, shale, calcareous quartzite, and granitic rocks. This soil occurs in the southwestern and central-eastern wings of the county on the tops of wide, deep glacial-till ridges. It also occurs around headwaters.

Included with this soil are poorly and very poorly drained spots of Monarda and Burnham very stony silt loams.

Dixmont very stony silt loam, 0 to 2 percent slopes, is nearly all forested. It supports good stands of spruce, fir, and white-cedar that are cut for pulpwood, sawtimber, and poles (cedar). The trees harvested can easily be removed, but the roads are wet part of the spring unless drainage is provided.

The soil is well suited to pasture. If cleared, it would need the same management as the nearly level, stone-cleared silt loams. (Capability unit Vs-3.)

Dixmont very stony silt loam, 2 to 8 percent slopes (DyB).—This moderately well drained soil is gently sloping and has medium runoff. It is extensive in the southwestern and central-eastern wings of the county. In stoniness it is similar to the nearly level Dixmont very stony silt loam.

Included with this soil are areas with occasional rock outcrops and areas with poor or very poor drainage where seepage or springs occur. Small, well-drained areas of very stony Bangor silt loam are also included in places.

Although a few stony areas are cleared and used for pasture, this gently sloping soil is generally wooded. It supports good stands of mixed northern hardwoods and conifers—mainly spruce, fir, poplar, birch, maple, white-cedar, and hemlock. In the moderately well drained areas, scattered ash, beech, and white pine also occur. Lumbering can be carried on without difficulty, although the roads may be wet for a time in spring.

This soil is excellent for sawtimber and pulpwood, as a good many kinds of trees grow rapidly. If cleared and cultivated, it can be managed like the Dixmont silt loams on similar slopes. (Capability unit VIs-3.)

Dixmont very stony silt loam, 8 to 15 percent slopes (DyC).—This soil has a profile similar to that described for the series except that the upper layers have not been mixed by plowing. It is sloping and has rapid runoff. It is widespread along the sides of deep and wide glacial-till ridges in the southwestern and central-eastern wings of the county.

Included with this soil are a few knolls and hill crests occupied by well-drained Bangor very stony silt loam, and scattered areas with bedrock outcrops.

Most of this sloping soil supports stands of mixed northern hardwoods and conifers. In a few of the stands, spruce and hemlock are dominant, but most stands include birch, maple, ash, and cedar. This soil is also suitable for clearing and tillage. Hay and pastures are more suitable than row crops. Tilled areas could be managed like Dixmont silt loam on similar slopes. Lumbering is carried on without difficulty, but on long slopes the woods roads may wash out in the spring or during a heavy rain. Gentle gradients or sodded roadsides will help to avert such damage. (Capability unit VIs-3.)

Elmwood Series

The soils of the Elmwood series are very deep, moderately well drained to somewhat poorly drained, and generally moderately slowly permeable. They have formed from about 2 feet of fine sandy glacial outwash over silt and clay deposits. The surface soil is brownish-yellow to pale-yellow very fine sandy loam to sandy loam. It is friable and medium to strongly acid. The subsoil is mottled gray, yellow, and brown fine sandy loam to silty clay loam. It is firm to very firm and is slightly acid to neutral.

The soils of this series occur mostly in the southern part of the valleys of the Penobscot and Kenduskeag Rivers, near Orono, Kenduskeag, and Bangor. The native vegetation consisted of maple, birch, and white pine. Scattered beech and other trees were also in the stands.

The Elmwood soils are members of a group that includes the well-drained Melrose that formed from similar materials. Other adjacent soils that formed from similar materials are the well-drained Suffield, the moderately well drained Buxton, the poorly drained Scantic, and the very poorly drained Biddeford. The Elmwood is similar to the Buxton soils in many characteristics but differs in having sandy surface soil.

Profile of Elmwood fine sandy loam on 3 percent slopes in a tilled area:

A_p 0 to 8 inches, brown (7.5YR 5/4) fine sandy loam; strong, medium, granular structure; very friable; medium acid; abrupt, smooth lower boundary.

B_{21} 8 to 10 inches, reddish-yellow (7.5YR 6/8) fine sandy loam; weak, fine, granular structure; friable; strongly acid; abrupt, wavy lower boundary.

B_{22g} 10 to 14 inches, light yellowish-brown (10YR 6/4) fine sandy loam that is mottled strong brown and yellow; weak, thin, platy structure; firm; medium acid; clear, wavy lower boundary.

B_{23g} 14 to 20 inches, loam or very fine sandy loam with clay lenses, mottled grayish brown, pale yellow, and brown; weak, medium, platy structure; firm; slightly acid; clear, wavy lower boundary.

$C1_g$ 20 to 30 inches, loam, strongly mottled pale brown and gray; yellowish streaks; weak, medium, platy structure; firm; slightly acid; abrupt, wavy lower boundary.

C_{2g} 30 to 40 inches +, silty clay loam, mottled with gray and dark gray or brown; moderately strong, thick, platy structure; very firm when moist; sticky and slightly plastic when wet; slightly acid to neutral.

The thickness of the fine sandy material over clayey material ranges from about 20 inches to nearly 3 feet.

The subsoil ranges from fine sandy loam to silty clay. In places it overlies sandy and gravelly glacial outwash at a depth of 5 or 6 feet from the surface. The mottling is most extreme in the middle subsoil; the intensity varies with the moisture content of the soil.

The Elmwood soils are low in nutrients. They are only moderately low in calcium in the lower subsoil. They all require high nitrogen fertilizer and enough lime for the crops grown.

Elmwood fine sandy loam, 0 to 8 percent slopes (EwB).—This very deep soil of the terraces has a profile similar to that described for the series. It is nearly level to gently undulating or gently sloping and has slow runoff. The water-absorbing capacity is moderately rapid, but both the water-holding capacity and the water-supplying capacity are excellent.

Included with this soil are small poorly drained areas and areas that have knolls of sandy or gravelly material.

Much of Elmwood fine sandy loam, 0 to 8 percent slopes, is cleared for crops and pasture. It is well suited to pasture, hay, small grain, and small fruits. Because of wetness, it is less well suited to the common crops—corn and beans, potatoes, and other vegetables. When the soil is adequately drained, however, these crops produce good yields. This soil is not generally suited to orchards. (Capability unit IIw–8.)

Hadley Series

The soils of the Hadley series are deep and well drained. The surface soil is dark grayish-brown or dark yellowish-brown, friable silt loam. The subsoil is dark-brown or yellowish-brown very fine sand and silt. Scattered pebbles and thin gravelly streaks are in the substratum.

The Hadley soils occur on the older natural levees of the larger stream bottoms. They are also common on the islands of the Penobscot River. These soils are subject to occasional flooding, but they are usually flood free during the cropping season.

The native vegetation consists mainly of mixed hardwoods and conifers. The stands include basswood, elm, birch, maple, pine, and spruce.

The Hadley soils are intermixed with the moderately well drained Winooski and the very poorly drained Saco in the slack-water areas of the bottom land. All of these soils are siltier than the Ondawa and Podunk, which occur on the sandier parts of the flood plains. The Hadley soils are generally darker than the Ondawa soils.

Profile of Hadley silt loam on a 2 percent slope in a wooded area:

A_p 0 to 10 inches, very dark grayish-brown (10YR 3/2) silt loam; moderately strong, medium, granular structure; friable; strongly acid; clear, wavy lower boundary.

C_1 10 to 14 inches, brown (10YR 5/3) silt loam; weak, medium, granular structure; friable; medium acid; clear, wavy lower boundary.

C_2 14 to 19 inches, brown (10YR 4/3) very fine sandy loam; weak, fine, granular structure; friable; medium acid; abrupt, smooth lower boundary.

C_3 19 to 30 inches +, dark grayish-brown (10YR 4/2) silt loam; weak, fine, granular structure; firm; medium acid.

The texture of the Hadley soils ranges from very fine sandy loam to silt loam. The proportion of coarser material and gravel in the substratum varies.

Hadley silt loam (Ha).—This soil has a profile similar to that described for the series. It is nearly level or gently undulating. It is deep and is silty throughout most of the upper layers. Runoff is slow, and the water-holding capacity is good. The soil is not generally erodible. Flooding occurs occasionally in spring (about once in 5 years), but there is usually none during the rest of the year. In areas on islands in the Penobscot River, the water table rises and falls with the river. The water table is generally low enough, however, to produce row crops most of the growing season.

Hadley silt loam is well suited to hay, potatoes, corn, oats, small grain, and cane fruits and to beans, peas, and other canning crops. It is not suited to orchards.

This soil is moderately productive, but complete fertilizer and lime are needed to produce good crop yields. The exact amounts needed should be determined by soil tests and the needs of the crops to be grown. Yields are usually high except when the soil is flooded. The soil supports good stands of mixed hardwoods. The stands include birch, basswood, maple, elm, pine, and spruce. Trees are cut for sawtimber and pulpwood. (Capability unit I–6.)

Hermon Series

The Hermon series consists of moderately deep to very deep, well-drained or somewhat excessively drained soils. In uncleared areas leaves, twigs, and a matted organic layer cover the black, thin upper surface soil. The lower part of the surface soil is gray and bleached. It overlies a dark yellowish-brown to pale-brown subsoil. In most areas the surface soil and subsoil are sandy. The parent material is a gray, coarse, granitic glacial till of Wisconsin Age. This till includes huge boulders of granite (fig. 13).

The Hermon are among the coarsest textured soils of the county. In some areas where shallow Canaan soils are intermixed, the Hermon soils are only moderately deep. Such areas occur particularly in the towns of Lakeville and Whitney (southeastern corner of the eastern wing).

Hermon soils occupy low hills. They also occupy all except the highest parts of the hills and mountains in the

Figure 13.—**Boulders in Hermon extremely stony sandy loam.**

extreme northern, eastern, and central parts of the county. Most areas are at elevations of 900 to 2,400 feet. Some are at lower elevations.

These soils were formed under forest that consisted chiefly of beech, birch, and maple. Some white pine, red spruce, and ash were in the stands.

The Hermon and Canaan soils are the only members in Penobscot County of a group of soils that formed from loose, granitic glacial till. In contrast, the Plaisted soils formed from very firm, mixed granitic and slaty glacial till. The Hermon soils are similar to the Plaisted soils in having formed from coarse-textured glacial till, but they differ in consistence. The Hermon soils are much coarser textured than the silty Bangor and Perham soils that developed from slaty glacial till. They have a comparatively low proportion of silt and clay. They also have less silt and clay than the wetter Howland, Monarda, and Burnham soils. Some areas of Hermon soils are adjacent to the excessively drained Colton soils on cobbly and gravelly outwash.

Hermon soils are extremely acid or strongly acid throughout the profile. They are well suited to northern hardwoods and white pine, but most areas are too stony to be well suited to tilled crops.

Profile of Hermon very stony sandy loam on a 6 percent slope in a wooded area:

A_{00} 3 inches to 0, loose, spongy, very dark brown mat of roots and organic detritus from northern hardwoods.

A_1 0 to 2 inches, very dark grayish-brown (10YR 3/2) gravelly loam; strong, coarse, granular structure; very friable; extremely acid; 40 to 50 percent coarse fragments; abrupt, smooth lower boundary.

A_2 2 to 4 inches, light-gray (10YR 7/1) gravelly sandy loam; very weak, thin, platy structure; very friable; extremely acid; 10 to 20 percent coarse fragments; abrupt, irregular lower boundary.

B_{21} 4 to 8 inches, reddish-brown (5YR 4/4) gravelly sandy loam; very weak, medium, granular structure; friable; very strongly acid; 50 to 60 percent coarse fragments; clear, irregular lower boundary.

B_{22} 8 to 16 inches, strong-brown (7.5 YR 5/6) gravelly sandy loam; very weak, medium, granular structure; very friable: very strongly acid; 50 to 60 percent coarse fragments; gradual, wavy lower boundary.

B_3 16 to 23 inches, yellowish-brown (10YR 5/4) gravelly sandy loam; structureless; loose; strongly acid; 60 to 80 percent coarse fragments and huge granite boulders; gradual, wavy lower boundary.

C_1 23 to 28 inches, light olive-brown (2.5Y 5/4) gravelly loamy sand; structureless; loose; strongly acid; 60 to 80 percent coarse fragments and boulders; diffuse, wavy lower boundary.

C_2 28 to 42 inches +, light-gray (10YR 7/1) bouldery granitic glacial till of loamy sand; structureless; loose; strongly acid; 60 to 80 percent coarse fragments.

The texture of the Hermon soils ranges from loam to coarse sandy loam. The proportion of coarse fragments is always high. Some profiles have a firm layer in the subsoil. The scattered stones and boulders range from a foot to many feet across.

Hermon sandy loam, 2 to 8 percent slopes (HbB).—This somewhat excessively drained soil of the upland has a dark-brown sandy loam surface layer about 6 inches deep. Below this depth the profile is similar to that described as typical of the series. This soil is undulating and has slow runoff because of a very rapid water-absorbing capacity. A few stones and boulders of granite and gneiss, about 10 to 12 inches in diameter, are scattered over the surface and in the soil. Boulders larger than 3 feet are shown on the map by a symbol.

Some areas of fine sandy loam and a few of loamy sand are included with this soil.

If enough lime and fertilizer are added to compensate for the naturally strong acidity and low fertility, Hermon sandy loam, 2 to 8 percent slopes, is suited to most crops and to orchards. It is well suited to blueberries and other small fruits. (Capability unit IIs–5.)

Hermon sandy loam, 8 to 15 percent slopes (HbC).—This soil has a dark-brown sandy loam surface layer about 6 inches deep. Below this depth the profile is similar to the one described as typical of the series. The relief is rolling. Because of the high water-absorbing capacity of the soil, runoff is medium. Both the water-holding capacity and water-supplying capacity are only fair; as a result, the soil is droughty.

Some shallow areas are included with this soil.

Hermon sandy loam, 8 to 15 percent slopes, is suited to blueberries and small fruits. It is not generally suited to other crops and orchards unless its natural low fertility and strong acidity are corrected. It can be used for forestry and will support good stands of trees, including hard maple, beech, birch, and white pine. The trees on this soil are usually deep rooted, grow somewhat rapidly, and make excellent sawtimber. They are more suitable for sawtimber than for pulpwood. Cutting for sawtimber will generally be made at less frequent intervals than for pulpwood, but the total volume of wood harvested for sawtimber may be greater. (Capability unit IIIes–5.)

Hermon sandy loam, moderately deep, 2 to 8 percent slopes (HdB).—This soil has a plow layer that consists of a mixture of the three upper layers; also, the soil is shallow to bedrock. Otherwise, it has a profile similar to that described for the series. The plow layer is a dark yellowish-brown (10YR 4/4) sandy loam. It has a weak, medium, granular structure. It is loose or very friable, is extremely acid, and contains 10 to 20 percent coarse fragments.

This moderately deep soil of the upland has undulating relief and slow runoff. It readily absorbs rainfall. It is not extensive and occurs mostly near Clifton and Lincoln.

This soil is suited to corn, oats, beans, potatoes, and small fruits when properly fertilized. Because of coarse texture and droughtiness, it is not well suited to orchards, peas, hay, and pasture. Green-manure crops would be of some help. (Capability unit IIs–5.)

Hermon sandy loam, moderately deep, 8 to 15 percent slopes (HdC).—This soil has a yellowish-brown to pale-brown surface layer. The rest of the profile is similar to that of Hermon sandy loam, moderately deep, 2 to 8 percent slopes. The soil has rolling relief. Because of rapid water absorption, it has slow runoff. It occurs only in a few cleared areas near Clifton and Lincoln.

Included with this sandy soil are a few poorly drained spots in depressions.

This soil is mostly in blueberries. It may be used for row crops, hay, or pasture. (Capability unit IIIes–5.)

Hermon very stony sandy loam, 2 to 8 percent slopes (HeB).—This soil has a profile similar to that described for the series. It is deep and well drained. Stones are common, and big granite boulders occur within the soil

and scattered over the surface. Because the capacity to absorb water is very high, runoff is slow. Both the water-holding capacity and the water-supplying capacity are only fair.

Small, moderately well drained and poorly drained spots are included with this soil.

This undulating Hermon soil is wooded. It supports good stands of white pine, beech, hard maple, and birch. Some fir and spruce are mixed in the stands. This soil is good for sawtimber. The trees grow rapidly, are deep rooted, and mature without blowing down. The interval between cuttings is not too long. Logging and cutting operations can be easily performed, and roads are usually constructed and maintained without difficulty. (Capability unit VIs–3.)

Hermon very stony sandy loam, 8 to 15 percent slopes (HeC).—This soil has a profile similar to that described for the series. It is well drained and has rolling relief. Runoff is only medium because the soil absorbs rainfall rapidly. The soil is extensive in the Millinocket area and in Clifton and Lakeville.

Included with this soil are small, wet or moderately well drained spots, as well as a few rock outcrops.

This rolling Hermon soil supports good stands of northern hardwoods and white pine and should be kept in woods. It is a good soil for sawtimber. The trees grow well, are deep rooted, and mature without blowing down. The interval between cuttings is not too long. Logging is not difficult on this soil, although some interference from huge boulders can be expected. Generally roads are easily constructed and maintained. (Capability unit VIs–3.)

Hermon very stony sandy loam, 15 to 45 percent slopes (HeE).—This soil has a profile similar to that described for the series. In some areas, however, it is not so coarse textured as the soil described. This is a steep, deep, somewhat excessively drained soil of the upland. Runoff is rapid. The soil is extensive throughout the northwestern and southeastern parts of the county and in the central part near Lincoln.

A few areas with rock outcrops and some areas of cobbly materials along streams are included with this soil.

This Hermon very stony sandy loam supports good stands of northern hardwoods and white pine. It is best suited to forestry. It is too dry for crops and grasses, but trees reach subsoil moisture and grow well. Lumbering and cutting operations are hampered somewhat by the slopes. Unless roads are constructed on the gentler gradients, they may wash out. (Capability unit VIIs–3.)

Hermon extremely stony sandy loam, 5 to 15 percent slopes (HhC).—This undulating and rolling soil has a profile similar to that described for the series, but it contains larger coarse fragments. Many huge boulders are scattered thickly over the surface (see fig. 13). They are so big or so numerous that clearing is practically impossible. Only a limited acreage can be cleared for blueberries. Most areas of this soil are in the northwestern and southeastern parts of the county near Norcross and Clifton.

Small, moderately well drained and poorly drained spots are included in the undulating areas of this soil.

This extremely stony sandy loam is generally wooded. Because of the huge boulders, the growth is thinner than on the very stony sandy loam. Hard maple, beech, birch, ash, and white pine are common trees. Usually the trees grow well after they are established. However, they do not reseed readily on this soil, and timber cutting should be selective.

Lumbering, as well as roadbuilding and road maintenance, is difficult and in places, practically impossible. Some stands of timber have been left uncut because they are hard to reach. (Capability unit VIIs–3.)

Howland Series

The soils of the Howland series are deep and moderately well drained to somewhat poorly drained. They have formed from mixed granitic and slaty glacial till that is firm to very firm. The surface soil is gritty loam or gravelly fine sandy loam. It is strong brown and yellowish brown to slightly mottled yellowish brown, pale brown, and brownish gray. It is friable to firm and has weak, fine, granular structure and moderately strong, thin, platy structure. The subsoil is mottled pale brownish gray and yellow to pale brown and yellowish brown. It is firm to very firm. It may have granular structure in the upper part and platy structure in the lower. The coarse fragments in the upper layers of these soils make up about 15 percent of the volume; they increase with depth to 40 or 50 percent of the volume.

These soils of the upland are extensive in the central-western, northwestern, and central-eastern parts of the county, near Seboeis, Millinocket, and Lakeville. They are scattered throughout the rest of the county in areas where the deep glacial till is somewhat sandy and gravelly.

The native vegetation consists of mixed conifers and some northern hardwoods. Spruce, fir, hemlock, white pine, maple, and yellow and white birch predominate. Stands are good and are cut for sawtimber and pulpwood.

The Howland soils are adjacent to the somewhat excessively drained and shallow Thorndike or Canaan soils, the deep and well-drained Hermon and Plaisted soils, and the poorly and very poorly drained Monarda and Burnham soils on similar parent materials. Most of the acreage of these soils is wooded and very stony. Although most of the acreage of the Howland soils is wooded, about a fourth is cleared and used for crops or pasture. Most of the gently sloping areas are in cropland.

All of the Howland soils are strongly acid and low in nitrogen. Both the water-supplying capacity and the water-holding capacity are good.

Profile of Howland very stony loam on a 3 percent slope in an area of virgin woods:

A and A_0 4 inches to 0, dark-brown and brown (10YR 4/3–5/3), loose to firm, fibrous and mottled accumulation of forest twigs and leaves.

A_1 0 to 1 inch, very dark grayish-brown (10YR 3/2) loam; weak, fine, granular structure, very friable; very strongly acid; 10 to 20 percent coarse fragments; abrupt, irregular lower boundary.

A_2 1 to 2 inches, light-gray (10YR 7/2) loam; weak, fine, granular structure; very friable; very strongly acid; 10 to 15 percent coarse fragments; abrupt, irregular lower boundary.

B_{21} 2 to 8 inches, strong-brown (7.5YR 5/6) loam; weak, fine, granular structure; friable; very strongly acid; 10 to 15 percent coarse fragments; clear, wavy lower boundary.

B_{22g} 8 to 16 inches, light yellowish-brown (10YR 6/4) loam, slightly mottled brownish gray and pale brown; moderate, medium, granular structure; firm; strongly acid; 20 to 30 percent coarse fragments; clear, wavy lower boundary.

B_{3gm} 16 to 22 inches, strongly mottled pale brownish-gray and yellow loam; strong, medium, platy structure; very firm to brittle; strongly acid; 30 to 40 percent coarse fragments; clear, wavy lower boundary.

C_{gm} 22 to 26 inches +, pale-brown (10YR 6/3) gravelly fine sandy loam that is slightly mottled yellowish brown and yellow; strong, medium, platy structure; very hard to brittle; medium acid; 30 to 40 percent coarse fragments; grades to a slightly mottled pale-olive and brown, very firm glacial till that is sandy and may include large granitic boulders.

The Howland soils range from gravelly loam to coarse sandy loam in the substratum, but they are mostly loam or fine sandy loam in the surface layer. The proportion of granitic and lime-seamed rock and pebbles in the glacial till varies. The degree of stoniness in the wooded areas also varies. Some areas have scattered small stones and cobblestones; others that are adjacent to very stony areas have boulders 4 and 5 feet across. Stoniness, however, does not interfere with lumbering and would not prevent the clearing and tillage of considerable acreages.

In cropped areas, the topmost layers are mixed and form an A_p horizon about 6 inches thick. This layer is yellowish-brown (10YR 5/4) gravelly loam; it has weak, fine, granular structure and is very friable. Coarse fragments make up about 10 to 15 percent of the volume. The lower boundary of this layer is abrupt and wavy. The B_{22} and succeeding layers are similar to those described for the profile in a wooded area.

Howland gravelly loam, 0 to 8 percent slopes (HoB).—This extensive soil has a yellowish-brown surface soil and a subsoil that is mottled brownish gray and pale brown. Otherwise it has a profile similar to the one described for the series. It is nearly level to gently sloping, and runoff is slow to medium. It is generally moderately well drained and therefore needs artificial drainage. This soil occurs on the top of glacial-till ridges that are broad, low, and deep. It also occurs on interstream areas in the central-western, northwestern, and central-eastern parts of the county, particularly near Seboeis, Millinocket, and Lakeville.

This soil is well suited to pastures and hay. If drained, it is also suited to small fruit, potatoes, oats, and beans. It is not well suited to peas or to orchards.

This soil is moderately low in fertility and very strongly acid. Cropped areas require lime and a complete fertilizer high in nitrogen. Pastures are usually topdressed for the production of good stands of grass. If the grazing is light, pastures should be mowed for weed control. (Capability unit IIw–4.)

Howland gravelly loam, 8 to 15 percent slopes (HoC).—This soil has a yellowish-brown surface soil and a subsoil that is mottled brownish gray and pale brown or yellow. Otherwise, it is similar to the profile described for the series. It has rapid runoff. Consequently, it is erodible and areas in tilled crops require runoff control. This extensive soil occurs along the sides of deep and broad glacial-till ridges in the towns of Seboeis and Millinocket and in neighboring areas.

Included with this sloping soil are small, well-drained areas and some seepage spots that are less than an acre in size. The seepage spots may require drainage if the soil is used for row crops. Also included are scattered areas with rock outcrops. These areas occur near streams and along ridge crests.

This sloping soil will produce most of the crops grown in the county. It is not well suited to orchards or corn, because of its damp subsoil. It is best suited to pasture, hay, and small fruit. (Capability unit IIIew–4.)

Howland very stony loam, 0 to 8 percent slopes (HvB).—This moderately well drained soil has a profile similar to that described for the series. It is nearly level to gently sloping and has slow runoff. Small boulders and stones of granite and quartzite are scattered over the surface. These do not interfere with lumbering, but they must be removed before crops can be grown. This extensive soil occurs on the tops of deep, glacial-till ridges in the towns of Seboeis and Millinocket and in neighboring areas. It forms with Hermon and Plaisted very stony soils an upland of alternating ridges and low swales.

Many poorly drained spots are included with this soil.

Most of this very stony loam is wooded. Good stands of spruce, fir, maple, birch, and pine are cut for pulpwood and sawtimber. Some ash and aspen also grow on areas that are a little better drained than normal. If cleared, the soil is suitable for crops and can be managed like Howland gravelly loam, 0 to 8 percent slopes. (Capability unit VIs–3.)

Howland very stony loam, 8 to 15 percent slopes (HvC).—This moderately well drained soil has a profile similar to the one described for the series. The soil is sloping and has rapid runoff. It is about as stony as the less sloping Howland very stony loam.

Some areas with bedrock outcrops and some small, extremely stony areas are included with this soil, especially where it is adjacent to mountainous land or extremely stony soils.

This sloping Howland very stony loam occurs along the sides of deep glacial-till ridges in or near the towns of Seboeis, Millinocket, and Lakeville. It also occurs near Woodville and Mattamiscontis. Here, it forms with the very stony Plaisted soils a pronounced pattern of low swales and gently rolling ridges.

This soil supports good stands of spruce, fir, hemlock, and white pine and of mixed northern hardwoods, including maple, ash, and birch. Trees grow rapidly. A lot of the land is owned by paper and timber companies. Pulpwood and sawtimber are harvested annually. Road construction and road maintenance are comparatively easy. (Capability unit VIs–3.)

Howland very stony loam, 15 to 25 percent slopes (HvD).—This soil has a profile similar to that described for the series. It is moderately steep to steep and has rapid runoff. It is moderately well drained. This soil is slightly stonier than Howland very stony loam, 8 to 15 percent slopes. In places near streams, extremely large granite boulders are scattered over its surface. These boulders average between 4 and 6 feet in diameter.

Bedrock outcrops are few in most areas. Where streams are entrenched in the deep till, however, outcrops of bedrock and extremely stony areas are included.

This moderately steep soil supports good stands of spruce, fir, white pine, and larch. Copses of maple and

birch are intermingled with the stands. Lumbering is sometimes hampered on the longer slopes because the roads are subject to washouts. Roads should be built on gentler gradients, and the banks should be sodded or packed to lessen the damage. Most areas of this soil are too steep to clear. (Capability unit VIs-3.)

Limerick Series

The soils of the Limerick series are poorly drained, deep to very deep alluvial soils. They have formed from silty and sandy stream deposits. These deposits consisted of materials from shale, slate, quartzite, and granite. The Limerick soils have a dark grayish-brown, silt loam surface soil that is friable to very friable and strongly acid. The subsoil ranges from silt loam to very fine sandy loam in texture. It is slightly to strongly mottled with gray, brown, and yellow. It is friable and extremely to strongly acid.

The Limerick soils commonly occur near all of the major streams in the county. They also occur in a few places around the inlet or outlets of lakes. They are subject to very frequent flooding when the snow melts. Flash floods occur during late spring and fall.

The native vegetation consists of willow, elm, soft maple, larch, spruce, and hemlock. Alders and other hydrophytic plants are thick in places.

The Limerick soils are members of a group of soils on flood plains. This group also includes the well-drained Hadley, the moderately well to somewhat poorly drained Winooski, and very poorly drained Saco soils.

Profile of Limerick silt loam on a 2 percent slope in a wooded area:

A_0 4 inches to 0, organic accumulation; in some places silty or very fine sandy stream deposits of recent origin.

A_1 0 to 9 inches, dark grayish-brown (10YR 4/2) silt loam; strong, coarse, granular structure; friable; very strongly acid; 5 to 10 percent coarse fragments (absent in places); abrupt, wavy lower boundary.

C_1 9 to 11 inches, slightly mottled gray and brown silt loam; weak, coarse, granular structure; very friable; strongly acid; 5 to 10 percent coarse fragments (absent in places); abrupt, irregular lower boundary.

C_{2g} 11 to 16 inches, intensely mottled gray and pale-brown silt loam; weak, fine, granular structure; friable; extremely acid; 10 to 20 percent coarse fragments (absent in places); abrupt, wavy lower boundary.

C_{3g} 16 to 30 inches +, intensely mottled gray and yellow gravelly loam; sandy clay streaks about an inch thick; stratified; friable; strongly acid to medium acid in lower part; 20 to 30 percent coarse fragments (fine gravel with a few cobblestones).

These soils vary in degree of stratification from one stream bottom to the next. In general all are silty or loamy in the upper layers and are gravelly and have silt or clay streaks in the lower layers. Areas along some of the streams have fewer cobblestones and gravel than those along others. Here the soils are less poorly drained.

The Limerick soils are moderately high in fertility and have more nitrogen than the better drained soils of the bottom land. They absorb water slowly, but their water-holding capacity and water-supplying capacity are excellent.

Limerick silt loam (Lk).—This soil has a profile similar to that described for the series. It is nearly level and has very slow runoff. It occurs mostly below the upland and terrace escarpments where the backwaters of the streams run during floods.

Outcrops that occur in many places in streambeds and along the margins of this soil are included. Also included are a few bouldery areas in mountainous sections where streams run through very stony and bouldery till.

This alluvial soil is nearly all forested. It is best suited to the production of pulpwood. As the trees tend to be shallow rooted and to blow over easily, they are not suitable for sawtimber. Roads are difficult to construct on this wet soil. They are difficult to maintain except during the winter when the ground is frozen and covered with snow. In winter the nearly level roads allow easy access to pulpwood cuttings. This soil is suited to pasture. Drainage is usually not feasible. (Capability unit VIw-6.)

Machias Series

The Machias series consists of deep, moderately well drained sandy soils on glacial outwash. The surface soil is dark grayish brown or brown to yellowish brown. It ranges from friable to very friable. The subsoil is fine sandy loam or loam that is mottled yellowish brown, olive yellow, and gray or olive gray. In places it is gravelly.

The native vegetation consists primarily of softwoods, mainly spruce, fir, and hemlock. Some white pine, maple, birch, and aspen are also in the stands.

The Machias soils occur principally on the nearly level to gently undulating glacial terraces in the valley of the Penobscot River. Here they are intermingled with the well-drained Stetson and Colton soils and with the poorly drained Red Hook and Atherton soils. In the southern part of the valley, the Machias soils are adjacent to Elmwood and Melrose fine sandy loams that occur over silt and clay.

The Machias soils are generally acid and are low in lime and nutrients. They respond well to complete fertilizers high in nitrogen, and to heavy applications of lime. They are high enough above the flood stage of the river to be drained successfully. The capacity of these soils to absorb water is medium. Their capacity to hold and supply water is good. There is usually a high water table in spring; it becomes lower as the year progresses.

Profile of Machias fine sandy loam on a 2 percent slope in a hayfield:

A_p 0 to 6 inches, very dark brown (10YR 2/2) fine sandy loam; strong, medium, granular structure; very friable; strongly acid; abrupt, smooth lower boundary.

B_{21} 6 to 8 inches, yellowish-brown (10YR 5/6) gravelly fine sandy loam; strong, fine, granular structure; friable; strongly acid; abrupt, wavy lower boundary.

B_{22g} 8 to 20 inches, brown (10YR 5/3) gravelly fine sandy loam that is slightly mottled with pale yellow in the lower part; weak, coarse, granular structure; friable; strongly acid; clear, wavy lower boundary.

B_{3g} 20 to 26 inches, gravelly fine sandy loam that is mottled with yellowish brown and olive gray; weak, thin, platy structure; firm; medium acid; gradual, wavy lower boundary.

D_1 26 to 34 inches, gravelly loamy fine sand that is strongly mottled with olive gray and pale yellow; weak, thick, platy structure; firm; medium acid; gradual, wavy lower boundary.

D_2 34 to 40 inches +, stratified layers of fine sand, silt, and gravel that are slightly mottled with pale brown and olive gray; weak, thick, platy structure; firm; medium acid.

The texture of the Machias soils ranges from silt loam to gravelly sandy loam. In some areas the subsoil is more intensely mottled than in others. Also, there are some areas where it is primarily sand and silt containing thin streaks of gravel and other areas where it is underlain by gravel and sand at 20 inches or more.

Machias fine sandy loam, 0 to 8 percent slopes (MaB).—This soil has a profile similar to the one described for the series. It is moderately well drained, very deep, and nearly level to gently undulating. It has slow runoff. Permeability is moderately rapid in the surface soil. In most places it is moderately slow in the subsoil, but in some it is moderate.

Included in this mapping unit are gravelly and cobbly knolls where the soil is drier than usual.

A large part of this soil is cleared. Some of the cleared acreage is used for crops, and the rest is in old hayfields. Some areas are in woods. The principal crops are beans and corn for canning and strawberries, red raspberries, and cultivated blueberries. If drained, the soil is well suited to pastures and forage crops, as well as to most other crops. It is not well suited to peas or to apple orchards, because of its low position and impaired drainage. (Capability unit IIw–5.)

Madawaska Series

The soils of the Madawaska series are very deep and moderately well drained to somewhat poorly drained. They have formed primarily from river deposits that are no longer flooded and are relatively gravel free. They are friable to firm. The surface soil is dark yellowish-brown very fine sandy loam or silt loam. It is very friable or friable. The subsoil is fine sandy loam that is mottled brown, olive brown, gray, and yellow.

The native vegetation is a mixture of hardwoods and softwoods. The stands include maple, birch, spruce, white pine, and hemlock.

The Madawaska soils occur in many places with the well-drained Allagash and the poorly drained Red Hook and very poorly drained Atherton soils. They are most extensive along the central basin of the Penobscot River. They make up an extremely small proportion of the soils in the county.

Profile of Madawaska very fine sandy loam on a 2 percent slope in a hayfield:

A_p 0 to 6 inches, dark-brown (10YR 4/3) very fine sandy loam; weak, fine, granular structure; very friable; strongly acid; abrupt, smooth lower boundary.

B_{21} 6 to 10 inches, dark yellowish-brown (10YR 4/4) fine sandy loam; weak, fine, granular structure; friable; very strongly acid; clear, smooth lower boundary.

B_{22g} 10 to 15 inches, very fine sandy loam mottled with brown, olive brown, gray, and yellow; weak, fine, granular structure; friable; strongly acid; clear, wavy lower boundary.

B_{3g} 15 to 26 inches, very fine sandy loam strongly mottled with brown, olive brown, gray, and yellow; weak, thick, platy structure; firm; medium acid; gradual, wavy lower boundary.

C_g 26 to 32 inches +, very fine sandy loam and thin gravel streaks; slight mottles of olive gray and pale brown; weak, thin, platy structure; firm; medium acid.

The texture ranges from silt loam to sandy loam. There are a few streaks of gravelly fine sandy loam. Mottles in the subsoil range from few to many and start at a depth of 8 to 16 inches. Most of the mottling is apparent at a depth of 14 inches.

The Madawaska soils have low natural fertility and are strongly acid. Crops require complete fertilizer and heavy applications of lime. These soils have a medium water-absorbing capacity. Their capacity to hold and supply water is good. The water table is high in spring but recedes in summer and fall. These soils have good workability. Since nearly all the slopes are less than 6 percent, the soils are not erodible.

Madawaska very fine sandy loam, 0 to 8 percent slopes (MbB).—This soil has a profile similar to that described for the series, but in undisturbed wooded areas it has two or three extra upper layers. These are (1) a dark grayish-brown loam or silt loam about 1 or 2 inches thick, (2) a light-gray very fine sandy loam about 2 inches thick, and (3) a dark-brown fine sandy loam about 2 inches thick. These layers are very friable and have a weak, medium or fine, granular structure.

This nearly level to gently sloping soil is on the very deep postglacial terraces of the Penobscot River and its tributaries. It is in slight depressions next to the upland. This soil is most extensive along the central valley area near Greenbush, Passadumkeag, and Howland.

Included with this soil are shallow areas near the river and high upland, where bedrock outcrops. Also included are areas that are coarser textured and gravelly in places.

Madawaska very fine sandy loam, 0 to 8 percent slopes, is nearly level in most places and is not erodible. Only a small part of it is cleared for crops and pasture. Beans, corn, small grain, small fruit, and hay and forage crops do well on this soil, especially if it is drained. Drainage increases yields of most crops. Heavy applications of both lime and complete fertilizer are also needed for good yields. Orchards, as well as peas and other crops needing good drainage, are not well suited to this soil. Most of the soil is wooded and has good stands of spruce and fir. Much pulpwood is cut. (Capability unit IIw–5.)

Made Land

Made Land (Md).—This miscellaneous land type includes town and city dumps, airports, and city structures. It also includes a few places where old quarries and gravel pits have been filled with other materials.

Melrose Series

The Melrose series consists of very deep, well-drained sandy soils. They have formed from outwash that overlies fine-textured silt and clay deposits. They occur on marine and lacustrine terraces in the southern part of the valley of the Penobscot River and in a few other places where tributary streams entered the Penobscot River system. The upper layers to about 15 inches are brown and strong-brown fine sandy loam. From 15 to about 35 inches, the soil is light yellowish-brown and pale-brown loamy fine sand or loam. This material overlies gray silty and clayey material that extends to a depth of 4 feet or more. There is almost a total lack of coarse fragments in these soils.

The native vegetation was spruce, fir, and white pine. Maple, birch, white-cedar, and hemlock were mixed in the sands. Stands that occur on these soils are excellent and

reproduce well after cutting. Both sawtimber and pulpwood are harvested.

The Melrose soils are usually near or adjacent to the excessively drained Adams, the well-drained Suffield, and the moderately well to somewhat poorly drained Elmwood soils. They are also adjacent to the well-drained Stetson, the moderately well drained Machias, and the poorly drained Red Hook and Atherton soils—all on sandy and gravelly glacial outwash terraces.

Profile of Melrose fine sandy loam on a 2 percent slope in a tilled area:

A_p 0 to 7 inches, brown (7.5YR 5/4) fine sandy loam; strong, medium, granular structure; very friable; very strongly acid; abrupt, smooth lower boundary.

B_{21} 7 to 10 inches, reddish-yellow (7.5YR 6/8) fine sandy loam; weak, coarse, granular structure; friable; strongly acid; clear, wavy lower boundary.

B_{22} 10 to 15 inches, strong-brown (7.5YR 5/6) fine sandy loam; weak, fine, granular structure; friable; strongly acid; clear, wavy lower boundary.

B_{3u} 15 to 24 inches, light yellowish-brown (10YR 6/4) loamy fine sand; structureless; loose; medium acid; clear, wavy lower boundary.

C_1 24 to 32 inches, pale-brown (10YR 6/3) loamy fine sand speckled with gray; contains silt and clay varves; structureless; very friable; medium acid; abrupt, wavy lower boundary.

C_2 32 to 40 inches, grayish-brown (10YR 5/2) silty clay loam that is slightly mottled with pale yellow; weak, thick, platy structure; very firm; slightly acid or neutral; gradual, wavy lower boundary.

D 40 to 46 inches +, silty clay that is streaked with gray (10YR 6/1), yellow, and brown; massive; very firm; neutral or slightly acid.

The depth of the fine sandy upper layers to the underlying clay ranges from 12 to 40 inches, but it generally averages about 20 inches. In some areas the clay is sticky and plastic when wet and very hard when dry. The color of the upper layers ranges from yellowish brown to dark grayish brown except in undisturbed wooded areas. Here the surface layers may consist of a very dark gray A_1, a pale-brown A_2, and a dark-brown B_2 layer. The rest of the profile is similar to the one described for the series.

In most areas the upper layers are quite acid and are low in fertility. Heavy applications of lime and complete fertilizers are needed for good yields. Water is generally rapidly absorbed by these soils. The water-holding capacity is excellent, and the water-supplying capacity is good because of the combination of sand and clay in the lower subsoil. The water table is usually low during summer, but it may be high in spring.

Melrose fine sandy loam, 0 to 2 percent slopes (MeA).—This soil has a profile similar to that described for the series. It is nearly level and has slow runoff. The sandy surface soil, however, absorbs water rapidly. The rapid absorption keeps the soil from becoming waterlogged unless the clay is nearer the surface than normal. This soil occurs mostly on the marine and lacustrine terraces near Howland and southward to Old Town, where the deposits are mixed sand and clay.

Included with this soil are small spots of somewhat poorly drained soils and gravelly knolls near the glacial outwash.

Melrose fine sandy loam, 0 to 2 percent slopes, is one of the better soils in the county for crops. It is nearly all cleared; about half of the cleared acreage is in crops, and half is in pasture. This soil is well suited to most of the tilled crops in the area and to small fruit. It is a little less suitable for hay and pasture. It is poorly suited to apples because air drainage is not good. In addition, the trees may winterkill in areas where the clay is close to the surface.

This soil has a negligible amount of erosion. It should be fertilized and limed according to the needs of the crops grown. On some of the deeper and sandier parts, irrigation may also be required during the summer. Crop yields are usually good, but those of pasture and hay vary according to the closeness of the clay to the surface. (Capability unit I–5.)

Melrose fine sandy loam, 2 to 8 percent slopes (MeB).—The profile of this soil is similar to that described for the series, but it may be yellower in some areas. This soil is gently sloping and has medium runoff. It is not subject to erosion because rainfall is rapidly absorbed. It occurs mostly on the larger marine and lacustrine terraces south of Lincoln and Howland and along the valley of the Penobscot River.

In areas adjacent to the Stetson and Colton soils, a few gravelly knolls are included with this soil. Also included in many places are intermingled areas of the moderately well drained Elmwood soils.

This soil is about half in crops and half in pasture. Canning corn, beans, peas, potatoes, and other vegetables are grown and are well suited to this soil. Because of the poor air drainage on these gently sloping terraces, apples are not suited. Heavy applications of lime and complete fertilizer should be used, but the amounts needed vary with the crops. (Capability unit IIe–5.)

Melrose fine sandy loam, 8 to 15 percent slopes (MeC).—This soil has a profile that is generally similar to the one described for the series. The surface soil, however, is thinner in places. This soil occurs mostly as narrow escarpments along the terrace margins. It has rapid runoff. In some places streams have cut into the sandy surface and exposed the underlying clay.

Scattered outcrops are included with this soil near entrenched streams and also where the terrace is next to the shallow upland. A few knolls of gravel and stony materials are also included.

This sloping Melrose fine sandy loam is nearly all wooded and supports good stands of mixed northern hardwoods and softwoods. A small part of it is cleared and in pasture, hay, or crops. Some runoff control is needed on tilled areas. The crops and management used are similar to those of the gently sloping Melrose fine sandy loam. (Capability unit IIIe–5.)

Mixed Alluvial Land

Mixed alluvial land (Mn).—This miscellaneous land type consists of an intricate pattern of silty, sandy, and gravelly soils of the flood plains. This land type is poorly to moderately well drained. The surface soil is generally acid silt loam, loam, or sandy loam. It is dark brown to yellowish brown. The subsoil is generally gravelly loam, sandy loam, or silt loam. It is mottled pale yellow, brown, and gray. The reaction ranges from very acid to neutral. On some flood plains occupied by this land type, gravelly and sandy knolls of well-drained soil are interspersed with more poorly drained soil in old, filled-in stream meanders.

Mixed alluvial land occurs most frequently in narrow stream valleys throughout the county, particularly in the north and east. It also occurs on wide bottoms that receive considerable material from adjoining uplands and terraces. Flooding is frequent, and spring or fall freshets often submerge this land type.

Mixed alluvial land is mostly wooded and supports good stands of northern softwoods and hardwoods. White pine, maple, birch, and beech, and some spruce and ash, are on the better drained areas. Spruce, white-cedar, fir, and hemlock are on the wetter areas. Only a very small part is cleared and is mostly in pasture or hay. (Capability unit VIw-6.)

Monarda Series

The Monarda series consists of poorly drained, deep soils formed from slaty and shaly glacial till or mixed granitic and slaty glacial till. The upper layers are gray to light-gray silt loam or loam. They are friable and strongly acid to medium acid. The subsoil is silt loam or loam that is strongly mottled with brown, olive brown, and light olive brown. It is firm to very firm and medium acid to neutral. The coarse fragments range from 10 to 50 percent by volume. They differentiate this soil from Scantic silt loam, which it resembles.

The Monarda soils occur throughout most of the county. They are on interstream areas, as well as on the tops of broad glacial-till ridges where the slopes are generally concave. They are most extensive in the north and central upland area near Argyle, Enfield, and Woodville. Scattered areas of all sizes, however, are in nearly every town of the county. The Monarda are among the principal soils in the broad spruce-fir flats from which most of the pulpwood is cut.

The native vegetation is mostly softwoods that include spruce, fir, white-cedar, pine, and hemlock. Maple and birch grow on knolls that are less poorly drained.

The Monarda soils are in the same areas with the well-drained Bangor and Plaisted soils and the less well-drained Dixmont and Howland soils. The excessively drained Hermon soils occur near the Monarda to a less extent.

Nearly all of the Monarda soils are low in organic matter. They all absorb rainfall very slowly, but they have an excellent water-holding capacity and a good water-supplying capacity.

Monarda silt loam on a 2 percent slope in a pasture:

A_p 0 to 8 inches, very dark grayish-brown (10YR 3/2) silt loam; moderately weak, medium, granular structure; friable; strongly acid; 10 to 20 percent coarse fragments; abrupt, smooth lower boundary.

A_{2g} 8 to 11 inches, pale-olive (5Y 6/3) silt loam mottled with pale yellow (2.5Y 7/4); weak, thin, platy structure; friable; strongly acid; 10 to 20 percent coarse fragments; clear, wavy lower boundary.

B_{21gm} 11 to 18 inches, silt loam that is mottled with light olive brown (2.5Y 5/4) and gray (N 5/); weak, medium, platy structure; very firm; brittle; strongly acid; 20 to 30 percent coarse fragments; clear, wavy lower boundary.

B_{22gm} 18 to 23 inches, silt loam that is intensely mottled with gray (5Y 5/1), brown (10YR 4/3), and pale brown (10YR 6/3); strong, medium, platy structure; very firm (brittle); medium acid; 20 to 30 percent coarse fragments; gradual, wavy lower boundary.

B_{31gm} 23 to 35 inches, silt loam strongly mottled with pale brown (10YR 6/3) and light olive brown (2.5Y 5/4); strong, thin, platy structure; very firm (brittle); medium acid; 20 to 30 percent coarse fragments; gradual, wavy lower boundary.

B_{32gm} 35 to 44 inches, silt loam mottled with gray (5Y 6/1) and olive brown (2.5Y 4/4); weak, thin, platy structure; very firm (brittle); medium acid; 40 to 50 percent coarse fragments; clear, wavy lower boundary.

C_g 44 to 52 inches +, yellowish-brown (10YR 5/4) silt loam slightly mottled with pale brown (10YR 6/3); very weak, fine, subangular blocky structure; very firm, very hard when dry; slightly acid; 30 to 40 percent coarse fragments.

In areas where the Monarda soils formed from slaty glacial till, they are generally silt loam. In areas where they formed from mixed granitic and slaty glacial till, they range from fine sandy loam to loam. The silty Monarda soils are usually medium acid to neutral, and the loamy or fine sandy loam Monarda soils are very strongly to slightly acid. They are very stony in many places. The amount and size of stones vary. Some areas have scattered stones, several inches in diameter; others have boulders, 3 to 4 feet or more in diameter.

In some low, extensive, very stony and extremely stony areas that are poorly and very poorly drained, the Monarda soils are mapped in undifferentiated units with the Burnham soils.

Monarda silt loam, 0 to 8 percent slopes (MoB).—This soil has a profile similar to that described for the series (fig. 14). It is a deep, poorly drained, nearly level and gently sloping soil. Runoff is slow. The water table is frequently high, but it usually recedes during dry weather. This soil is common in the swales and lowlands of the agricultural parts of the county.

Figure 14.—**Profile of Monarda silt loam, 0 to 8 percent slopes.**

Scattered outcrops of bedrock and some gravelly knolls are included with this soil.

About half of Monarda silt loam, 0 to 8 percent slopes, is cleared. About a third of the cleared area is in pasture. The other two-thirds, which is in fields of better drained soils, is in hay, oats, and potatoes. This soil is best suited to pasture and hay. If adequately drained, it is also moderately well suited to corn, oats, and other small grains and to cane fruits and potatoes. It is not generally suited to orchards or to peas and such root vegetables as carrots and beets.

Good stands of spruce and fir occur on the wooded half of this soil. These are cut for pulpwood. This soil is excellent for pulpwood. The trees grow rapidly but are shallow rooted. Many trees will blow over before maturity. Cutting for pulpwood, therefore, should be made before the trees mature. Roads are sometimes wet on this soil, but they can be drained or graded enough for use during most of the year. (Capability unit IIIw-3.)

Monarda and Burnham very stony silt loams, 0 to 8 percent slopes (MrB).—The soils of this undifferentiated unit have profiles that resemble those described separately for the Monarda and Burnham series. They have a surface mat of organic material, about 3 to 8 inches thick. The surface soil in general is very dark grayish-brown silt loam, loam, or very fine sandy loam, several inches thick. Underlying the surface soil is strongly mottled olive-brown and gray or gray and grayish-brown, heavy silt loam, gritty silt loam, or loam and very fine sandy loam. These materials are very firm.

This unit has very slow runoff and water absorption. It has a good capacity to hold and supply water. The water table is usually higher and remains high longer in the areas of silt loam than in those of very fine sandy loam or loam.

In some places this undifferentiated unit consists of a poorly drained and very poorly drained succession of knolls and shallow depressions; in others it occurs in slight depressions. It is gently sloping in some of the mountainous areas of the county.

Monarda and Burnham very stony silt loams, 0 to 8 percent slopes, are most extensive in the southwestern and eastern wings of the county, where Bangor, Thorndike, and Dixmont soils occur. Loamy or very fine sandy loam areas of this unit occur mostly in the central-northern and northeastern wooded areas (in the towns of Seboeis and Millinocket), where the well-drained Plaisted and Hermon soils are common. A few, scattered bedrock outcrops and extremely bouldery clumps are included near the mountainous areas.

The Monarda and Burnham very stony soils are all wooded at present. Stoniness makes them generally unsuitable for clearing. Some areas have a moderate amount of scattered stones that are 10 to 12 inches in diameter; others have boulders that are 3 to 4 feet in diameter. Some areas, however, are not too stony to be cleared for pasture.

These soils are best suited to the production of pulpwood. They support good stands of spruce, fir, white pine, hemlock, and other softwoods. Many areas are known as spruce-fir flats. Maple and birch are also in the stands where better drained knolls and other soils are intermixed with these soils. These trees should be cut for pulpwood rather than left for sawtimber, as large trees easily blow over. Some areas of these soils are too wet to permit the hauling of pulpwood except in winter. (Capability unit VIIsw-3.)

Monarda and Burnham extremely stony silt loams, 0 to 15 percent slopes (MsC).—The soils in this undifferentiated unit have profiles similar to those described for the Monarda and Burnham series except for the surface layers, which consist of A_0, A_1, and A_{2g} horizons. Most areas of these soils are more than 3 feet deep to bedrock. This unit is the stoniest and shallowest very poorly drained area in the county. Characteristic of this unit are huge boulders, 4 and 5 feet through, and smooth expanses of bare rock outcrop, interspersed with marshy and wet, deep, very stony glacial till areas.

This unit is generally nearly level to sloping in the lowlands and on interstream areas, but it is moderately steep in some areas of the mountains. Runoff is very slow to medium except in the mountains, where it is rapid in places. The soil is quite wet and is often springy. In addition to silt loam and very fine sandy loam, other textures are included in this undifferentiated unit.

These extremely stony soils are most extensive in the mountainous areas in the extreme northern part of the county, around the Passadumkeag Mountains and Little Peaked Mountain north of Clifton. Other smaller areas occur with the Thorndike and Dixmont soils in the southwestern corner of the county. Most areas occur with Rockland (both Canaan and Thorndike materials) and with extremely stony and very stony Hermon and Plaisted soils.

All areas of the Monarda and Burnham extremely stony silt loams are wooded. Some are in commercial forests. Trees suitable for commercial use grow in nearly all of the very deep areas away from bedrock exposures. These areas are known as spruce-fir flats. In some areas near cliffs, the trees generally remain uncut because of stoniness. Heavy equipment is needed to dislodge the boulders before the trees can be cut. Short, scrawny trees grow in many places on these soils. These trees frequently blow over. A cutting of pulpwood in such places may not be repeated for many years because of the slow regrowth. (Capability unit VIIsw-3.)

Muck

Muck (Mu).—This is a very poorly drained, deep, black, granular soil. It has formed from well-decomposed organic materials from aquatic plants and coniferous and deciduous trees. It occurs in the smaller bogs of the county, along the margins of larger peat bogs, and in scattered steep-sided depressions, a few acres or less in size. The upper part of Muck may be strongly acid, but the lower part is usually only slightly acid or neutral.

Muck supports dense stands of white-cedar, spruce, and fir. Birch, aspen, and maple grow where the organic materials are thin.

Neighboring soils are also usually poorly drained. These include the stony Monarda and Burnham soils on glacial till, the Red Hook and Atherton soils on glacial outwash, and, in some areas, the Biddeford and Scantic soils on silt and clay deposits.

Profile of Muck in a nearly level area of a cedar swamp:

A_0 8 inches to 0, dark reddish-brown (5YR 2/2), fibrous accumulation of coniferous forest material; weak, granular structure; friable; pH 4.6; abrupt, smooth lower boundary.

1 0 to 28 inches, black (5YR 2/1) muck; moderately strong, medium, granular structure; friable; pH 6.0; clear, wavy lower boundary.

2 28 to 112 inches, very dark-brown (10YR 2/2), disintegrated peat; moderately strong, medium to fine, granular structure; slightly sticky; pH 6.0; diffuse, wavy lower boundary.

3 112 to 132 inches, olive (5Y 5/3) sedimentary peat; massive; plastic and nonsticky; pH 6.8; clear, smooth lower boundary.

D 132 to 138 inches +, greenish-gray (5GY 5/1) silt or silty clay; massive; slightly plastic and sticky; pH 6.8.

Muck in this county ranges from strongly to extremely acid in the upper part to generally less acid in the lower part. The depth to silt or silty clay ranges from 3 to 10 feet and averages about 6 feet. Some muck bogs include peaty materials.

The forests on Muck are one of the principal sources of cedar posts and poles. At present this soil is used mainly for these products. (Capability unit VIIw–9.)

Ondawa Series

Ondawa soils are generally well drained and deep. They have formed from sandy and silty stream deposits that include coarse sand and fine gravel. The surface soil is dark yellowish-brown, very friable fine sandy loam. The subsoil is yellowish-brown to pale-brown, firm to loose fine sandy loam to gravelly fine sandy loam. It is strongly acid.

The Ondawa soils occur near the main streams on the largest flood plains. They are subject to occasional flooding but are usually free of floods during the cropping season. They form natural levees in many places and remain above floodwater part of the time. Some areas make up part of the islands in the Penobscot River.

The native vegetation consists of mixed hardwoods and conifers. Included in the stands are basswood, elm, birch, maple, pine, and spruce.

The Ondawa soils are intermixed with the moderately drained Podunk and the very poorly drained Saco soils. All of these soils have formed from similar materials. In areas where streams cut through sandy and gravelly glacial outwash, the Ondawa soils are also adjacent to the Stetson and Colton soils.

Profile of Ondawa fine sandy loam on a 2 percent slope in a hayfield:

A_p 0 to 8 inches, dark yellowish-brown (10YR 4/4) fine sandy loam; strong, medium, granular structure; friable; strongly acid; abrupt, smooth lower boundary.

C_1 8 to 13 inches, yellowish-brown (10YR 5/8) fine sandy loam; weak, fine, granular structure; very friable; strongly or medium acid; clear, wavy lower boundary.

C_2 13 to 23 inches, pale-yellow (2.5Y 7/4) fine sandy loam; structureless; very friable; medium acid; clear, smooth lower boundary.

C_3 23 to 43 inches +, pale-yellow (2.5Y 7/4) to gray (N 5), black-speckled fine sand and gravel; stratified; loose; medium acid; boundaries between strata are clear or abrupt and smooth or wavy.

The Ondawa soils range in texture from fine sandy loam to sandy loam. Some areas on the points of islands and along the shoreline, where the coarser material accumulates, have a texture of fine sand or sand. The color of the surface layer of the Ondawa soils ranges from dark brown to olive yellow or olive brown. Most areas are well drained, but a few sandy areas have somewhat excessive internal drainage.

Ondawa fine sandy loam (On).—This soil has a profile similar to that described for the series. It is nearly level to gently undulating, has slow runoff, and is not generally erodible.

Absorption of water is moderately rapid. The capacity to hold and supply water is good to excellent. The water table in this soil rises and falls with the nearby streams. The soil is subject to infrequent stream gouging during periods of high water but can be tilled most of the year.

Gravelly and cobbly knolls along the shores and the points of islands are included with this soil.

Ondawa fine sandy loam is best suited to hay, pasture, and small grain, but it is well suited to corn and small fruits and to beans, peas, and other canning crops. It is not suitable for orchards. Only the areas not flooded in fall are suitable for potatoes.

In general this soil is low in organic matter, very low to low in phosphorus and potassium, and high to very low in lime. Since this alluvial soil varies greatly, tests are needed to determine the right amounts of amendments to apply. Yields are usually good when lime and complete fertilizers are applied in amounts determined by crop needs. This soil supports good stands of mixed hardwoods and conifers. Growth is rapid, and both sawtimber and pulpwood are cut. (Capability unit I–6.)

Peat

Peat, coarsely fibrous (Pc).—This peat is poorly drained. It occurs in the swamps, bogs, and kettle holes throughout the county. The total acreage, however, is quite small.

The upper layers, to a depth of about 7 feet, are brown to reddish yellow and slightly sticky to nonsticky. The layers below are brown to olive brown and may be nonsticky to about 10 feet. All layers are extremely acid and coarsely fibrous. In the middle layers, tree stumps, logs, and limbs are prominent.

The native vegetation consists of northern conifers. Nearly pure stands of black spruce and larch grow on some bogs or kettle holes. Heath (*Ericaceae*) is usually in the understory. Pine, hemlock, maple, and birch also grow on the shallower margins of the bogs.

Soils adjacent to Peat, coarsely fibrous, are usually the poorly drained and very poorly drained Monarda and Burnham soils on till and the poorly drained and very poorly drained Red Hook and Atherton soils on glacial outwash. Some areas of Peat, coarsely fibrous, occur in kettle holes and are surrounded by the excessively drained Colton soils or the moderately well drained Machias soils—both on glacial outwash.

Profile of Peat, coarsely fibrous:

A_{00} 8 to 2 inches, nonsticky, brown surface mat of sphagnum moss, tree roots, conifer needles, and forest debris.

A_0 2 inches to 0, black, coarsely fibrous muck from well-decomposed plant remains; strong, medium, granular structure; slightly sticky; extremely acid; abrupt, smooth lower boundary.

1 0 to 3½ feet, strong-brown (7.5Y/6) woody peat containing small fragments of partially rotted woody material; extremely acid; slightly compact and moderately coarsely fibrous; slightly sticky; diffuse, wavy lower boundary.
2 3½ to 7 feet, brown to reddish-yellow (7.5YR 6/8) woody peat; contains parts of logs and roots; nonsticky and porous; coarsely fibrous; extremely acid; clear, wavy lower boundary.
3 7 to 10 feet, brown (10YR 5/3) sedimentary woody peat; contains very small fragments of woody and herbaceous material, probably rushes and sedges; slightly compact and finely fibrous; slightly sticky; extremely acid; abrupt, smooth lower boundary.
4 10 to 12 feet, light yellowish-brown (10YR 6/4), finely divided sedimentary woody peat that is mixed with a little sand and silt in the lower part of the layer; slightly sticky; extremely acid; diffuse, wavy lower boundary.
5 12 to 13 feet, olive-brown (2.5Y 4/4) compact mixture of finely divided sedimentary peat, very fine sand, and silt; very strongly acid; sticky; diffuse, wavy lower boundary; shades to bluish-gray (5B 5/1) silt.

The profile is deeper in some areas and shallower in a few than the one described. In all areas, however, the depth of this peat is more than 8 feet to the mineral sediments in the bottom of the depressions.

The bogs are used for pulpwood and sawtimber—particularly pulpwood. A few areas may be cleared for blueberries, but this peat is generally too coarse and too acid for commercial use. (Capability unit VIIw–9.)

Peat, moderately fibrous (Pf).—This peat is very deep and very poorly drained. It occurs mostly in large swamps, marshes, and bogs that have standing water in the center. It is widespread throughout the county, particularly in the central, western, and northern parts. Some of the bogs contain islands of stony till or rock outcrop.

The upper layers to a depth of about 12 feet are dark reddish brown, fibrous, and nonsticky. The layers below this depth are olive brown to a depth of about 23 feet; upon exposure to air they become very dark grayish brown. The material is finely fibrous to sedimentary and nonsticky. The underlying silt at 23 feet is bluish gray, massive, and sticky. The peat is extremely acid in the first 5 feet, strongly acid to a depth of 7 feet, and medium to slightly acid or neutral in the lowest layers.

The native vegetation consists primarily of cattails, rushes, sedges, larch, heath bushes, and some red maple and scattered black spruce.

Soils commonly near Peat, moderately fibrous, are all poorly or very poorly drained. These are the Monarda and Burnham soils on till and the Red Hook and Atherton soils on outwash. A few areas of well-drained soils on eskers and stony till are also adjacent to this peat.

Profile of Peat, moderately fibrous, in a brushy area:

A_0 4 inches to 0, black (N 21) muck; strong, coarse, granular structure; finely fibrous; slightly sticky; extremely acid; abrupt, smooth lower boundary.
1 0 to 6 feet, dark-brown (7.5YR 4/4) peat that contains many partially decomposed segments of rushes, sedges, and herbaceous plants; finely fibrous; nonsticky; extremely acid; clear, wavy lower boundary.
2 6 to 12 feet, dark reddish-brown (5YR 2/2) raw peat; fibrous; nonsticky; extremely acid to strongly acid; gradual, wavy lower boundary.
3 12 to 16 feet, very dark grayish-brown (2.5Y 3/2) raw peat; finely fibrous; nonsticky; medium to slightly acid; gradual, wavy lower boundary.
4 16 to 23 feet, olive-brown (2.5Y 4/4) raw peat; very finely fibrous; sedimentary; slightly sticky; neutral; clear, smooth lower boundary.
D 23 to 24 feet +, dark greenish-gray (5GY 4/1) silt; massive; sticky and nonplastic; neutral.

This peat varies considerably in the proportions of fibrous and sedimentary material. In some bogs the material consists of woody peat. In most bogs, however, it consists of remains of sedges and rushes or other aquatic plants. This peat is less acid in general than the coarsely fibrous and sphagnum peats.

The bogs in which this peat occurs are generally very deep. The margins of some are shallow, however, and contain only a foot or two of peat or muck. These areas support dense stands of spruce, fir, aspen, maple, and birch. They produce good pulpwood or sawtimber. Other areas of Peat, moderately fibrous, are best suited to wildlife. This peat is much too fibrous and shrinks too much for use as commercial litter. (Capability unit VIIw–9.)

Peat and Muck

Peat and muck (Pa).—This unit consists of very poorly drained organic materials—black muck and brown peat—that vary in depth and composition. Most areas are deep and are combinations of both peat and muck. This unit occurs in large areas in marshes and bogs in the northern and eastern parts of the county and elsewhere in small, scattered potholes or wet depressions, 1 or 2 acres in size.

The native vegetation is usually heath and scattered spruce and larch. Some margins of the bogs, however, support dense stands of spruce and fir. Maple and birch are also common where the peat and muck are thin.

Generally the soils adjacent to this unit are poorly and very poorly drained. Where an esker (horseback), glacial-till ridge, or rock outcrop borders this mapping unit, however, the adjacent soils are frequently well drained. Usually the adjacent poorly and very poorly drained soils are the Monarda and Burnham stony soils on till and the Red Hook and Atherton sandy and silty soils on glacial outwash.

Profile of Peat and muck in a shallow sphagnum bog near Alton:

1 0 to 20 inches, matted, fibrous sphagnum peat with some finely divided materials; pH 3.3.
2 20 to 48 inches, dark reddish-brown (5YR 2/2) muck; appears fibrous even though it contains much finely divided material; weak, coarse, platy structure; some mineral soil in lower part; pH 3.3; has the appearance of peat.
D 48 to 52 inches +, dark olive-gray (5Y 3/2) silt loam; massive; slightly sticky and plastic; pH 3.7.

Profiles of these organic materials vary considerably. Other unclassified organic materials are similar to those of the peat and muck but need to be checked in the field.

Stony and rocky soils are included in this mapping unit. They usually make up promontories or small areas of till in the bogs or along their margins.

Peat and muck are suitable for wildlife and recreational areas. They have very little value for commercial forests and usually are not deep enough to mine or work as a muck soil. (Capability unit VIIw–9.)

Peat, Sphagnum

Peat, sphagnum (Ps).—This peat consists of very poorly drained, very deep organic material. It occurs in the southern and southeastern parts of the county where remnants of deep glacial lakes occur. In drainage and general color it is similar to the coarsely fibrous and moderately fibrous (rush and sedge) peat. It does not, however, have the standing timber that grows in many places on the coarsely fibrous peat nor the watery centers that occur on the moderately fibrous peat. Most of the sphagnum peat bogs are usually open and are shaped like a dome that has a slope of about 3 percent from the center.

The upper layers of this peat, to a depth of 12 feet, are dark reddish brown, very fibrous, and nonsticky. The lower layers, to a depth of about 18 feet, are very dark brown to very dark grayish brown, fibrous to finely fibrous, and slightly sticky. All layers except the lowest are extremely acid. The layers at the bottom of the bog are strongly acid to medium acid. The underlying silty or silty clay materials may be slightly acid.

The native vegetation is primarily heath and a few scattered larch and spruce trees. Maple, white pine, and poplar grow in many places around the thinner margins of the sphagnum bogs.

Soils next to the sphagnum bogs are usually wet. They are primarily the Monarda and Burnham soils on till and the Red Hook and Atherton soils on outwash. A few areas of the well-drained and very stony Plaisted and Bangor soils on till, and of the Stetson and Colton soils on outwash, also are near the sphagnum bogs.

Peat, sphagnum, in a heath bog:

A_{00} 6 inches to 0, light yellowish-brown (10YR 6/4) cover of sphagnum moss and roots of low-growing heath; coarsely fibrous; extremely acid; abrupt, smooth lower boundary.

1 0 to 10 inches, dark reddish-brown (5YR 2/2) sphagnum peat; nonsticky; extremely acid; coarsely fibrous; clear, smooth lower boundary.

2 10 to 72 inches, brown (10YR 5/3) sphagnum peat; finely fibrous; nonsticky; extremely acid; gradual, wavy lower boundary.

3 6 to 12 feet, dark reddish-brown (5YR 3/2), finely fibrous and sedimentary sphagnum and woody peat with alternating bands of woody material and sphagnum moss in the lower part; slightly compact; extremely acid; clear, wavy lower boundary.

4 12 to 18 feet, strong-brown (7.5YR 5/8), fibrous sedge and woody peat that contains small fragments of partially rotted woody and rushy material; nonsticky; extremely acid; clear, smooth lower boundary.

5 18 to 24 feet, grayish-brown (10YR 5/2), finely fibrous and sedimentary sedge and rush peat; slightly sticky; slightly compact; extremely acid; abrupt, smooth lower boundary.

D 24 to 25 feet +, dark-greenish gray (5GY 4/1) silty clay; massive; sticky and plastic; medium acid.

The thickness of the sphagnum moss on the surface of the bogs ranges from 1 to 10 feet. In nearly all places the sphagnum moss is underlain by woody and brushy or herbaceous peat.

Most deep sphagnum bogs are commercially valuable, and many of them are mined in nearby Hancock and Washington Counties. At the time of this report they were not mined in Penobscot County. (Capability unit VIIIw–9.)

Perham Series

The Perham series consists of deep, well-drained soils. These soils have formed from neutral to calcareous glacial till that contains a pronounced quantity of silt and clay. The till also contains small fragments of dark-gray, fine-grained, lime-seamed slate, as well as calcareous quartzite and limestone. In tilled areas the surface layer is light-brown silt loam. It is friable to firm and acid. The subsoil layers are dark-brown gravelly silt loam or silty clay loam. They are very firm in place and are neutral to calcareous in the lower part. The Perham soils have two sequences of horizons in the profile—one sequence below the other.

The Perham soils occur in the same areas as the Plaisted, Daigle, Thorndike, and Monarda soils. They are much finer textured in the lower layers than the Plaisted soils. They are better drained than the Daigle, Dixmont, and Monarda soils. The texture of the Perham soils is as fine as that of the Bangor soils, or finer. The color is browner.

The native vegetation consists of northern hardwoods—primarily beech, maple, and yellow birch. Spruce, fir, and white-cedar are mixed with the stands. The wooded areas have been cut repeatedly for pulpwood.

Most of the Perham soils are moderately productive. They are low in nitrogen, however, and require a complete fertilizer high in nitrogen for good yields. Crop needs and soil tests will determine whether lime should be applied. These soils have a medium capacity to absorb water and a good capacity to hold and supply it. In some of the moderately deep areas, the water table may be high in spring.

Profile of Perham gravelly silt loam, 2 to 8 percent slopes, in a cultivated area:

A_p 0 to 9 inches, light olive-brown (2.5Y 5/6) gravelly silt loam; moderate, medium, granular structure; friable; acid; abrupt lower boundary. 8 to 12 inches thick.

B_{21} 9 to 15 inches, strong-brown (7.5YR 5/8) gravelly silt loam; medium, granular structure; friable; acid; clear lower boundary. 2 to 6 inches thick.

B_{22} 15 to 21 inches, yellowish-brown (10YR 5/6) gravelly silt loam; weak, medium, granular structure; friable; acid; clear lower boundary. 6 to 10 inches thick.

$A_{2'}$ 21 to 26 inches, grayish-brown (2.5Y 5/2) silt loam; thin, platy structure; friable; acid; clear lower boundary. 2 to 6 inches thick.

$B_{21'}$ 26 to 36 inches, dark-brown (10YR 4/3) gravelly silt loam; prismatic and subangular blocky structure; clay film on sides of prisms; firm in place, slightly brittle when removed; acid; clear lower boundary. 8 to 15 inches thick.

$B_{22'}$ 36 to 56 inches, light olive-brown (2.5Y 5/4) gravelly clay loam; subangular blocky structure; clay films on peds; firm; neutral; clear lower boundary. 20 to 25 inches thick.

C 56 to 70 inches, olive-brown (2.5Y 4/4) gravelly loam; no structure; massive; firm in place, friable when removed; no clay films; alkaline. 8 to 14 inches thick.

D 70 inches +, nearly vertical, bedded, hard gray shale with few, weak lime seams.

The Perham soils range from 4 or 5 feet deep to bedrock to a much greater depth. In some areas they do not have clearly defined subhorizons and are somewhat like the Bangor silt loams except in color. Nearly all the Perham soils are brown or dark brown, whereas the Bangor soils are definitely olive or olive brown in their lower layers.

Perham silt loam, 0 to 8 percent slopes (PhB).—This soil has a profile similar to that described for the series. It is a very deep soil on gentle slopes and has medium runoff. It occurs along the sides of deep, wide, and long glacial-till ridges near Patten and Stacyville.

Areas with a few widely scattered bedrock outcrops and shaly knolls are included with this soil.

Most of Perham silt loam, 0 to 8 percent slopes, is suited to potatoes, peas, and beans and to oats and other small grains. It is also well suited to grass, alfalfa, and other hay or forage crops. Most areas in tilled crops require erosion control. Contour farming can be practiced on the long and smooth slopes that occur on most areas of this soil.

This soil has a low supply of nitrogen in many areas. Otherwise, it has moderately high fertility. Crops need sidedressings and pastures need topdressings of nitrogen to produce good yields. Lime is not so necessary on the deeper rooted crops. After these crops get started, they can reach a supply of lime in the subsoil. Acidity of the surface layer, however, needs to be corrected to get the plants started. The amount of lime applied should be determined by soil tests and the needs of the crops to be grown. (Capability unit IIe–3.)

Perham silt loam, 8 to 15 percent slopes (PhC).—This deep to very deep soil has a profile similar to that described for the series. It has rapid runoff and is noticeably erodible, especially near entrenching streams. It occurs along the sloping sides of long, wide, glacial-till ridges near Patten, Stacyville, and Herseytown.

A few areas with scattered bedrock exposures and some with shaly knolls are included with this soil. Seepage spots near springs, usually less than an acre in size, are also included.

Because of its erodibility, this soil is best suited to pastures and to potatoes grown in rotations with small grain or winter cover crops. It is suited also to peas, small fruit, and forage crops. Any tilled area, however, needs complete conservation practices that will control runoff. This soil is medium to high in fertility and lime, but it is low in organic matter. Most crops except legumes require extra applications of nitrogen. Complete fertilizer and lime are applied for most crops. The amounts applied can be determined by soil tests and the needs of the crop to be grown. (Capability unit IIIe–3.)

Perham stony silt loam, 0 to 8 percent slopes (PmB).—Except for surface stoniness and the absence of the plow layer, this soil has a profile similar to that described for the series. It is gently sloping and very deep. It occurs on long, broad glacial-till ridges in Patten, Stacyville, Herseytown, and Drew. Runoff is slow, and tilled areas are slightly erodible. This soil has a moderate amount of stones. The scattered stones are 10 to 15 inches thick and are of lime-seamed slate, shale, or calcareous quartzite. A few boulders of sandstone and conglomerate are thinly scattered in areas where the soil borders very stony land. The stones can readily be removed for tillage. Some pastures can be established without removing the stones.

This soil includes outcrops and some seepage areas that are less than 2 acres in size. This stony silt loam is easily cleared and makes good cropland. Cleared areas are suited to the same crops and require the same erosion-control measures as Perham silt loam, 0 to 8 percent slopes. The natural fertility is medium, but the amount of organic matter is medium to low. Some of this soil is pastured, but by far the greatest part is wooded. Good stands of northern hardwoods, spruce, fir, and some white-cedar are cut for sawtimber and pulpwood. (Capability unit IVes–4.)

Perham stony silt loam, 8 to 15 percent slopes (PmC).—Except for surface stoniness and the absence of the plow layer, this soil has a profile similar to that described for the series. It is a sloping, deep, stony soil of the upland. It occurs along the sides of the long and broad glacial-till ridges in Patten, Stacyville, Herseytown, and Mt. Chase. Runoff is minimum, and tilled areas would be erodible. This soil has a moderate amount of stones.

Some rock outcrop and seepage areas that are less than 2 acres in size are included with this soil.

Perham stony silt loam, 8 to 15 percent slopes, is worth clearing and will make good cropland. It is suited to the same crops as Perham silt loam, 8 to 15 percent slopes, and requires the same measures to control runoff. The natural fertility is medium to high, but the amount of organic matter is medium to low. Part of the soil is pastured. Most of it is wooded, however, and supports good stands of northern hardwoods. Sawtimber and pulpwood are extensively cut on this soil, as the trees grow rapidly and do not blow over easily when mature. The areas are readily accessible, and roads can be maintained the year-around. (Capability unit IVes–4.)

Plaisted Series

The soils of the Plaisted series are well drained and moderately deep to very deep. They have formed from mixed granitic and slaty glacial till. This till contains a moderately low proportion of silt and clay and some lime-seamed phyllite, shale, slate, calcareous quartzite, and granitic rocks (fig. 15). Some of it was apparently worked by water and is in kamelike knolls. These knolls are common in the southern part of the county. Other areas of the extensive Plaisted soils are common in the northern and eastern parts of the county.

Figure 15.—**Wisconsin glacial till from which Plaisted soils formed. The till is more than 10 feet deep.**

The surface soil is dark yellowish-brown loam to stony loam. It is friable and strongly acid. The subsoil layers are yellowish-brown fine sandy loam to gravelly loam. They are extremely firm to firm and brittle and are strongly acid to medium acid.

The native vegetation consists of mixed hardwoods and softwoods. The stands include maple, beech, and birch and scattered spruce, fir, white pine, and hemlock.

The well-drained Plaisted soils are in the same areas as the shallow Thorndike and Canaan, the moderately well drained to somewhat poorly drained Howland, and the poorly drained and very poorly drained loamy Monarda and Burnham soils. In the Seboeis, Millinocket, and Clifton areas, the Plaisted soils are adjacent to excessively drained Colton soils on cobbly outwash and to the Hermon soils on bouldery granitic till.

The Plaisted soils are low to medium in natural fertility. Most crops require heavy applications of complete fertilizer. Some require additional applications of nitrogen during the growing season. The soils are nearly all strongly acid. All crops except potatoes require large applications of lime. In some areas of cultivated soils, however, the addition of lime has markedly raised the pH of the upper layers of the Plaisted soils. The deeper layers are acid in both tilled and cultivated areas.

Profile of Plaisted gravelly loam on a 5 percent slope in a cultivated area:

A_p 0 to 5 inches, dark yellowish-brown (10YR 4/4) gravelly loam; weak, medium, granular structure; very friable; strongly acid; 10 to 15 percent coarse fragments; abrupt, smooth lower boundary.

B_{21} 5 to 8 inches, strong-brown (7.5YR 5/6) gravelly loam; weak, fine, granular structure; friable; strongly acid; 15 to 20 percent coarse fragments; clear, wavy lower boundary.

B_{22} 8 to 14 inches, yellowish-brown (10YR 5/6) gravelly fine sandy loam; weak, fine, granular structure; very friable; strongly acid; 30 to 40 percent coarse fragments; clear, wavy lower boundary.

B_3 14 to 19 inches, light olive-brown (2.5Y 5/4) fine sandy loam; moderately strong, medium, subangular blocky structure; very firm; medium acid; 40 to 50 percent coarse fragments; gradual, wavy lower boundary.

C_{1m} 19 to 36 inches, pale-olive (5Y 6/2) sandy loam; weak, thick, platy structure; extremely firm and brittle; medium acid; 40 to 50 percent coarse fragments; gradual, wavy lower boundary.

C_{2m} 36 to 44 inches +, light-gray (5Y 7/2) sandy loam; weak, coarse, subangular blocky structure; extremely firm; brittle; medium to slightly acid; 60 to 70 percent coarse fragments; diffuse, wavy lower boundary at 50 to 55 inches; grades at 50 to 55 inches to a friable, light-gray sandy loam glacial till that contains many 3- and 4-foot granitic and lime-seamed stones.

In most places the texture of the surface soil is gravelly or stony loam, but in some places it is silt loam. In nearly all places the subsoil and parent till are fine sandy loam, but they may be gravelly and stony because of the influence of weathered granitic boulders. The consistence of the subsoil varies from friable to extremely firm. In some of the deepest till it is loose. The degree of looseness depends on the amount of moisture and coarse fragments.

Plaisted gravelly loam, 2 to 8 percent slopes (PgB).—This soil has a profile similar to that described for the series. It is a very deep, gently sloping and gently undulating soil on low glacial-till ridges in the central and northeastern part of the county. It has slow runoff and a medium capacity to absorb water. Erosion, therefore, is relatively inactive, and only simple conservation practices would be needed in tilled areas.

In some areas the soil is moderately deep and has scattered outcrops of either granitic or lime-seamed bedrock. Such areas are included with this soil, along with seepage spots and somewhat poorly drained areas less than 2 acres in size.

This Plaisted gravelly loam is well suited to potatoes, oats, beans, small fruit, and forage crops. A large part is still wooded and produces much pulpwood and sawtimber. It is exceptionally good for the production of mixed stands suitable for sawtimber. Complete fertilizer and side dressings of nitrogen during the growing season are needed to produce good yields of crops on this soil. Rates of application should be determined by the needs of the crops grown and by soil tests. Lime is also needed for most crops. Lime may cause scab on potatoes and is not needed in areas planted to this crop. (Capability unit IIe–3.)

Plaisted gravelly loam, 8 to 15 percent slopes (PgC).—This soil has a profile similar to that described for the series. It is very deep and is sloping or rolling. Runoff is rapid. This soil occurs along the sides of low glacial-till ridges in the central part of the county and on the sloping sides of high ridges in the northeastern and northern parts of the county.

Some areas with bedrock outcrops and clumps of stones are included with this soil.

This Plaisted gravelly loam is well suited to potatoes, pasture, hay, oats, and small fruit. Because trees grow well in the soil, it is well suited to the production of pulpwood and sawtimber. Hardwoods and softwoods are both common. Sugar maple, birch, beech, red spruce, fir, and white pine predominate in the stands. Tilled areas of this sloping Plaisted gravelly loam are moderately erodible and need erosion control. The slopes are usually long and smooth and favor contour cultivation, construction of diversion ditches, and similar practices. Complete fertilizer, side dressings of nitrogen, and lime are needed for good crop yields. Rate of applications should be determined by soil tests and by the needs of the crops grown. Because lime may cause scab, it is not often used on areas planted to potatoes. (Capability unit IIIe–3.)

Plaisted gravelly loam, 15 to 25 percent slopes (PgD).—This soil has a profile similar to that described for the series, but its surface soil is thinner and lighter colored in places. It is moderately steep or hilly and has rapid runoff.

Areas with bedrock outcrops and clumps of stones are included with this soil, as well as scattered seepage spots or springs.

Much of this Plaisted gravelly loam is in pasture, hay, or woods. It is best suited to pasture, small fruit, and hay or to the production of timber. It is generally too steep for tilled crops. It is very erodible when tilled. If suitable conservation practices are used, however, it will grow potatoes, oats, and forage crops. Complete fertilizer and lime are needed for good yields. The amounts applied should be determined by the needs of the crops grown and by soil tests. (Capability unit IVe–3.)

Plaisted gravelly loam, 25 to 45 percent slopes (PgE).—This soil has a profile similar to that described for the series. It is, however, thinner and lighter in color than the soil described. In some areas cut by streams, the

subsoil is exposed and the soil appears quite gray. This steep and very steep soil occurs on the sides of high till ridges in the northern part of the county and around entrenching streams in the central and eastern parts. It has very rapid runoff, and tilled areas would erode.

Areas with rock outcrops, boulder slumps, and springs are included with this soil.

Some of this Plaisted gravelly loam is in pasture and hay. Because of the steep slopes, none of it is tilled. Its best use is for trees, which are deep rooted and grow rapidly. The soil is excellent for the production of both sawtimber and pulpwood. Some of the steepest areas, however, are inaccessible to heavy equipment. Roads generally can be constructed on gentler sloping areas and protected against washouts. Draglines from these areas can then reach most of the steepest areas. (Capability unit VIe-3.)

Plaisted very stony loam, 5 to 15 percent slopes (PrC).—Except for many surface stones and the lack of a plow layer, this soil has a profile similar to that described for the series (fig. 16). It is a very deep soil of the upland. It is undulating to sloping or rolling and has slow or medium runoff. Granite, conglomerate, or quartzite boulders, 2 to 4 feet in diameter, are scattered over the surface. This soil occurs mostly in the northern and in the central-western areas of the county on the low glacial-till ridges of the Seboeis-Millinocket area.

Figure 16.—Profile of Plaisted very stony loam, showing coarse fragments and, near the top of the scale, a light, leached layer (bleicherde).

Extremely bouldery knolls and a few areas with bedrock exposures are included with this soil. Also included are scattered spots of moderately well drained and poorly drained soils.

The surface stones would have to be removed before this soil could be cultivated. Nearly all of the soil is wooded and supports excellent stands of spruce, fir, and white pine. Maple, beech, and birch are mixed in the stands. This soil is well suited to the production of both pulpwood and sawtimber, as the trees grow well and are deep rooted. Accessible roads can be constructed and maintained without too much difficulty. (Capability unit VIs-3.)

Plaisted very stony loam, 15 to 45 percent slopes (PrE).—Except for numerous surface stones and the absence of a plow layer, this soil has a profile similar to that described for the series. It is a deep and moderately deep soil of the upland. It is hilly to steep and has rapid runoff. Granite, conglomerate, and quartzite boulders, 3 to 4 feet in diameter, and intermixed smaller stones are scattered over the surface. This soil occurs mostly in the central and northern parts of the county, where the rivers are cutting steep channels through the high glacial-till ridges. The soil also occurs around the Passadumkeag Mountains in the central-eastern part of the county and near Clifton in the southeastern corner.

Areas with very bouldery knolls and those with bedrock outcrop are included with this soil. Spots of moderately well drained Howland soils are also included.

Nearly all of this steep, stony soil is wooded and supports excellent growths of mixed hardwoods and scattered conifers. Maple, birch, and beech are common. Fir and white pine are mixed with the stands. The soil is well suited both to pulpwood and to sawtimber. Lumbering may be hampered somewhat by the steep and very stony slopes. (Capability unit VIIs-3.)

Plaisted extremely stony loam, 5 to 15 percent slopes (PxC).—Except for numerous stones and boulders and the lack of a plow layer, this soil has a profile similar to that described for the series. It is moderately deep and deep. It has undulating to sloping or rolling relief and has slow or medium runoff. Large granite boulders, 4 or 5 feet or more in diameter, and thickly scattered stones and boulders of quartzite, conglomerate, and other materials occur on the surface. In a few places, the boulders are piled on top of one another. This soil occurs mostly in the northwestern and southeastern corners of the county near the mountainous areas.

Very stony marshy and wet areas are included with this soil. Some areas of rock outcrop, usually less than 2 acres in size, are included where this soil is adjacent to cliffs or shallow soils. Also included are somewhat poorly drained areas of very stony Howland soils.

This extremely stony soil is wooded and supports fairly good stands of mixed hardwoods and softwoods. It would be very difficult to clear this soil for tillage. Lumbering is difficult in bouldery areas, and reseeding may be slow in cutover areas. Once the trees are established, however, they grow rapidly. This is very good soil for wildlife because of the cover it provides. (Capability unit VIIs-3.)

Podunk Series

The Podunk series consists of strongly acid, moderately well drained, deep soils that have developed from sandy and gravelly stream deposits. They are subject to periodic flooding but are usually free from floods during the growing season. The surface soil is dark-brown or grayish-brown fine sandy loam or sandy loam. It is very friable and has strong, medium, granular structure. The subsoil is loamy fine sand to fine sandy loam that contains some gravel. It is mottled olive yellow and grayish brown or yellowish brown. It is firm and has fine granular structure.

The Podunk soils occur mostly on flood plains that are adjacent to areas of sandy and gravelly glacial till and outwash. They also occur on the sandy parts of the islands in the Penobscot River.

The native vegetation consists of mixed stands of willow, alder, soft maple, elm, pine, and other hardwoods and softwoods.

The Podunk soils are adjacent to the well-drained Ondawa and the poorly drained Limerick soils on most of the narrow flood plains in the central and northern parts of the county. They are near the silty Hadley and Winooski soils on the extensive flood plains in the southern part of the county. In areas where the terraces and uplands join the bottom land, the Podunk soils are near soils from outwash and glacial till.

Profile of Podunk fine sandy loam on a 2 percent slope in a pasture:

A_p 0 to 8 inches, very dark grayish-brown (10YR 3/2) fine sandy loam; strong, medium, granular structure; friable; strongly acid; abrupt, smooth lower boundary.

C_1 8 to 18 inches, olive-brown (2.5Y 4/4) fine sandy loam; weak, coarse, granular structure; very friable; strongly acid; abrupt, wavy lower boundary.

C_{2g} 18 to 30 inches, loamy fine sand mottled with olive gray and olive brown; weak, fine, granular structure; friable; strongly acid; clear, wavy lower boundary.

C_{3g} 30 to 40 inches +, sandy loam mottled with olive gray, dark brown, and pale yellow; underlain by fine gravel and sand; single grained; friable; medium acid.

The texture of the surface soil ranges from sandy loam to loam; the subsoil is usually sand and streaks of gravel. Like all of the soils from alluvium, these soils vary in stratification. Most of the Podunk soils consist of sandy materials that contain some gravel.

Podunk fine sandy loam (Py).—This soil has a profile similar to that described for the series. It is nearly level and has slow runoff. It has a good capacity to absorb and hold water and an excellent capacity to supply water. The water table is high during floods but recedes during the summer. This soil of the flood plain is more extensive in the northern part of the valley of the Penobscot River than in the southern part. The areas that occur on the islands in the Penobscot River are more uniform than elsewhere.

Knolls of gravel and some bedrock outcrops are included with this soil.

Podunk fine sandy loam is suited to pasture, small grain, small fruit, and corn. All of these will stand some flooding. The soil is best suited to pasture and hay. It is low in nutrients and lime. Heavy applications of amendments are needed to produce good yields. Split applications of nitrogen are especially beneficial to grass and forage crops on this lighter textured soil. (Capability unit IIw-6.)

Red Hook Series

The soils of the Red Hook series are deep, poorly drained, and moderately slowly permeable. They have formed from sandy, silty, and gravelly outwash. These water-worked materials are from lime-seamed slate, shale, and calcareous quartzite, as well as from some granite and gneiss. The surface soil is very dark grayish-brown and dark grayish-brown fine sandy loam or silt loam. It is friable and is strongly to medium acid. The subsoil is fine sandy loam or silty and gravelly loam (fig. 17). It is intensely mottled olive gray, pale brown, and yellow. It is slightly acid to neutral.

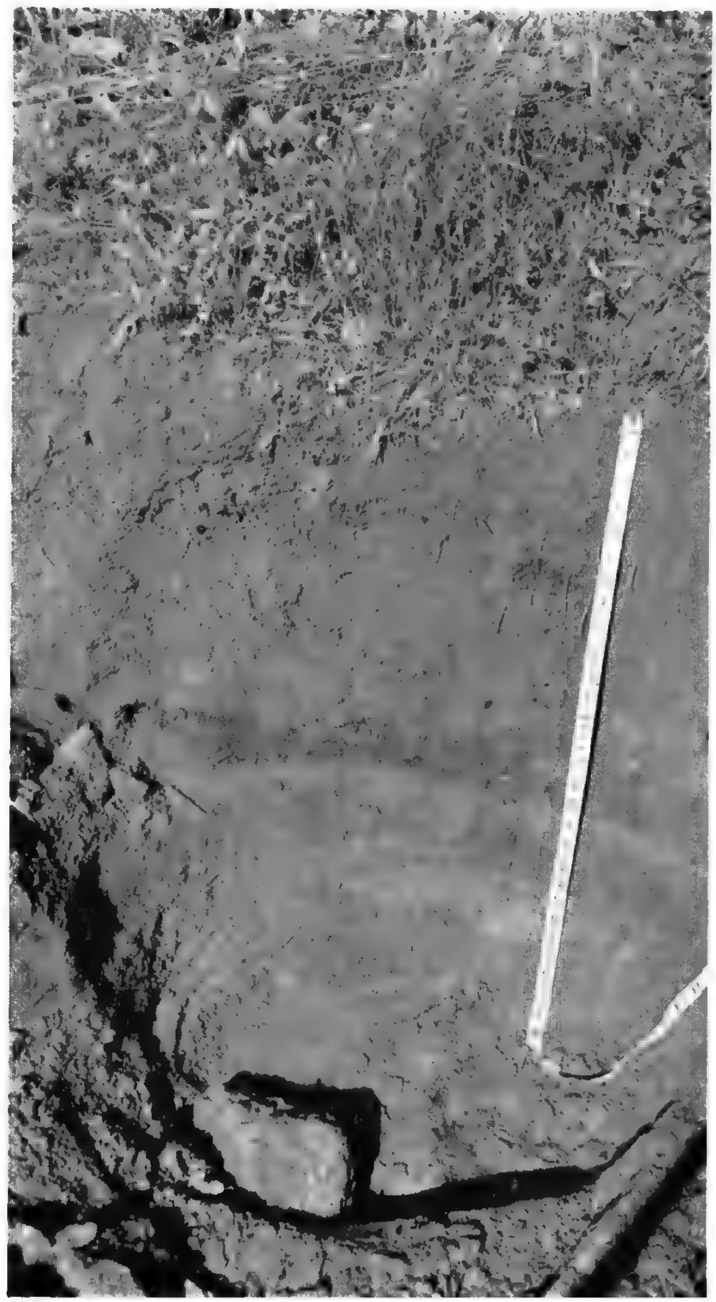

Figure 17.—Profile of Red Hook fine sandy loam.

The Red Hook soils occur along the major river valleys. They also cross the county near the eskers, or horsebacks.

The native vegetation consists mostly of softwoods. The stands include white pine and some yellow birch, larch, and hemlock. In some areas alders are profuse along incipient, wet drainage channels.

The Red Hook soils are members of a group that includes the well-drained Stetson and Allagash, the moderately well drained Madawaska or Machias, and the very poorly drained Atherton soils. All of these soils are from similar parent materials.

The Red Hook soils have a very poor water-absorbing capacity. Their water-holding capacity, however, is excellent and their water-supplying capacity is good.

A profile of Red Hook fine sandy loam on a 2 percent slope in a wooded area:

A_0 3 inches to 0, nearly black mat of decayed organic matter from spruce, fir, and other softwoods.

A_1 0 to 6 inches, very dark grayish-brown (10YR 3/2) fine sandy loam; strong, medium and fine, granular structure; friable; nonsticky; strongly acid; abrupt, smooth lower boundary.

B_{21g} 6 to 14 inches, very fine sandy loam that is mottled olive gray, pale brown, and yellow; contains clay lenses; weak, thin, platy structure; when displaced, material is friable and forms fine subangular blocky peds; slightly sticky; medium acid; abrupt, irregular lower boundary.

B_{22g} 14 to 18 inches, fine sandy loam mottled with dark olive, brown, and yellowish brown; contains silt lenses; weak, medium, platy structure; firm; strongly acid; abrupt, smooth lower boundary.

C_{1g} 18 to 32 inches, fine sandy loam with a noticeable content of silt; intensely mottled with olive gray, pale brown, and pale yellow; weak, thick, platy structure; firm; medium acid.

The Red Hook soils range from 20 to 40 inches in depth to gravel. A few areas on the more sandy terraces are practically free of gravel. Areas that are transitional to soils formed from silt and clay (Buxton, Scantic, and Biddeford) are more silty and include more clay in the subsoil.

The Red Hook soils in the county are mapped only as undifferentiated units with the very poorly drained Atherton soils. These soils occur together on generally wet lowlands.

Red Hook and Atherton fine sandy loams, 0 to 8 percent slopes (RdB).—The Red Hook and Atherton soils in this undifferentiated unit have profiles similar to those described for their respective series.

Small areas of better drained sandy and gravelly soils are included with this soil.

A limited acreage of the poorly drained areas of this undifferentiated unit is cleared and is mostly in pasture and hay, or in small grain. The Red Hook soils are suited to these crops but must be drained before they can produce good yields. The Atherton soils are rarely cleared because they are wet most of the year. The soils in this unit are not suited to any of the tilled crops.

The Red Hook and Atherton fine sandy loams are nearly all wooded. They are best suited to the production of pulpwood. Spruce, fir, and other softwoods grow rapidly, and cuttings can be made more often than on dry soils like the Colton gravelly sandy loams or cobbly sandy loams. Trees on these Red Hook and Atherton soils should be cut before they get too large; otherwise, they may blow down. Woods roads are difficult to construct and maintain on these soils. The woods are wet much of the spring, and a rank growth springs up in them nearly every year. (Capability unit IIIw–5.)

Red Hook and Atherton silt loams, 0 to 8 percent slopes (RaB).—Except for texture of the surface soil, the Red Hook and Atherton soils in this undifferentiated unit have profiles similar to those described for their respective series. This unit consists of poorly and very poorly drained, deep, silty soils of the terraces. It is nearly level and has very slow runoff. All areas are wet most of the year, and some are marshy. The soils of this unit are most extensive along the central basin of the Penobscot River in the bordering flat-topped glacial outwash. They also occur on areas back of eskers (horsebacks) and between the terraces and the upland.

Sandy spots and scattered bedrock outcrops are included with areas of these soils that are adjacent to upland materials and coarse terrace materials.

The Red Hook and Atherton silt loams are mostly in spruce, fir, and other softwoods. A few areas of the Red Hook silt loam in this unit are cleared and are in pasture and hay. The soils in this unit are excellent for the production of pulpwood, but, unless drained, they generally are not suited to crops or grain. The Red Hook silt loam is suited to grass. The Atherton silt loam is not suited to tillage or row crops without drainage. Both soils generally can be drained, as they are usually several feet or more above the level of the streams.

Lumbering operations are somewhat hampered in the spring when the soils are marshy. Roads are difficult to construct and maintain, unless some drainage can be provided. (Capability unit IIIw–5.)

Riverwash

Riverwash (Re).—This miscellaneous land type occurs mostly in the channels of the large streams. It consists of water-deposited sand, gravel, boulders, and mixtures of these. In a few places the material is silty. In other places, especially where streams flow into the lakes, it is fine sand or very fine sand. Deposits of the sandy material occur in the northern part of Millinocket and near lakes.

Only a few scattered clumps of grass grow on Riverwash. This land type is useful only for building material. (Capability unit VIIIw–6.)

Rockland

Rockland, Canaan material, sloping (RkC).—This miscellaneous land type consists of very shallow, somewhat excessively drained, rocky upland. It has only a few, scattered stones and boulders but many smooth granite outcrops. The profile, where there is enough soil material to form one, is similar to that described for the Canaan series.

This land type has formed from thin granitic glacial till and smooth granite outcrops. It occurs on top of many of the highest hills and mountains in the county. It is generally sloping. Many areas are near Mount Turner in the northwestern corner of the county and east of Clifton near Little Peaked Mountain.

Areas that have deeper pockets of soil material than normal for this land type and occasional wet pockets or

marshy areas, less than 2 acres in size, are included. Small areas of sloping Hermon very stony sandy loam are also included.

Rockland, Canaan material, sloping, has rapid runoff. Its water-holding capacity is very low, and its water-supplying capacity, except in the deeper areas, is negligible. Consequently, it has poor, thin stands of pine, spruce, aspen, and birch, and a thick cover of ground juniper (*juniperus communis* var. *depressa*). This kind of forest has no commercial value and is best suited to hiking, skiing, and other recreational uses. Even wildlife has difficulty maintaining itself on such land. Some areas near Lincoln and Lakeville are quarried for building materials. (Capability unit VIIs–1.)

Rockland, Canaan material, strongly sloping (RkD).—This miscellaneous land type consists of very shallow, excessively drained rocky areas. It is usually very steep and has very rapid runoff. However, there is little soil material to be carried away by runoff. The streams are therefore usually clear. Large boulders and stones several feet in diameter, as well as large exposures of bedrock, are common. The profile of the soil in the deeper pockets and on the less steep slopes of this land type is similar to that described for the Canaan series.

Some of this land type is in the Mount Katahdin recreational area in Baxter Park. It also occurs near East Turner Mountain and Horse Mountain at East Grand Lake. Other common areas are near the Passadumkeag Mountains south of Burlington and east of Clifton on Little Peaked Mountain.

Deeper pockets of very stony material, as well as occasional wet basins or depressions in the rocks, are included with this land type. Steep areas of extremely stony Hermon soils are also included.

This Rockland is too steep and the soil too thin for much tree growth. The trees are mostly scattered and stunted or twisted white pine, red spruce, aspen, and birch. In places only ground juniper will thrive. A little sawtimber and a little pulpwood are cut, but only on the deeper soils that are included with this land type. This Rockland is best suited to hiking, skiing, and other recreational uses. It is also suited to wildlife habitats. Some areas are quarried for building materials. (Capability unit VIIs–1.)

Rockland, Thorndike material, sloping (RmC).—This miscellaneous land type consists of very shallow, somewhat excessively drained upland. Slopes range from 5 to 15 percent. Few areas are stony, but many have rock outcrops. The profile of the soil in the deeper parts of this land type is like that described for the Thorndike series, but the depth is rarely more than 1 foot.

This land type has formed from thin, slaty glacial till and lime-seamed bedrock, slate, shale, phyllite, and quartzite. Generally, it occurs on low, sloping ridges and undulating or rolling knolls in the southwestern part of the county, especially near Dixmont, Carmel, and Etna. It is also scattered over the rest of the county in areas that, in general, are lower than those of Rockland, Canaan soil material. In many areas it is near the Bangor, Dixmont, Monarda, and Burnham very stony soils—all on deeper till.

Small marshy areas in rock depressions and small pockets of muck and peat are included with this land type. A few knolls of gravelly and cobbly materials are also included in areas near glacial outwash.

This Rockland is generally wooded and supports thin stands of white-cedar, white pine, aspen, and birch. Ground juniper also covers large areas, especially old eroded pastures. Most of the stands are of no commercial value and are cut only for cedar posts or cordwood. A few acres in fields with better soils are pastured, but the grass cover usually dries out during dry summers. (Capability unit VIIs–1.)

Rockland, Thorndike material, strongly sloping (RmD).—This miscellaneous land type consists of very steep and very shallow rocky upland. It has formed from thin, slaty glacial till and large exposures of lime-seamed bedrock of slate, phyllite, and quartzite. It occurs on the lower slopes of the mountains and along the sides of entrenching streams. The upper part of the slopes are not exceptionally stony, but stones have accumulated on the lower part near the foot of cliffs and steep mountains. The soil in the deeper pockets along the slopes has a profile similar to that described for the Thorndike series, but it is rarely more than a foot deep. Many areas of this land type are adjacent to the extremely stony Hermon and Plaisted soils. Very stony and cobbly areas near entrenching streams are included with this land type.

All of this land type is wooded. Most of the trees are not suitable for commercial use. Stands of white-cedar, white pine, aspen, and birch are common. Scattered red spruce and maple grow in the deeper pockets of soil material. Cutover areas reseed slowly on this land type. This strongly sloping Rockland is suitable for hiking, skiing, and other recreational use and for wildlife habitats. It is also a suitable source of building materials. In the southwestern and other parts of the county, the lime-seamed bedrock readily fractures and is dug out for road material. (Capability unit VIIs–1.)

Rock Outcrop

Rock outcrop (Ro).—This miscellaneous land type consists primarily of rock outcrop that has very little soil. It occurs on the tops of the highest mountains, where the relief is undulating or sloping, and along their flanks, where the relief is very steep and cliffs are common. Some of the cliffs are 500 feet, or more, high. Others form the sides of stream-cut gorges that are many feet deep. Rock outcrop is a prominent part of the landscape around the mountains in the northern and southeastern parts of the county. There is generally no soil material and little or no vegetation except ground juniper, lichens, and mosses. Horse Mountain in Baxter Park, near First Grand Lake, is an example of Rock outcrop. This land type is best suited to recreation. (Capability unit VIIIs–1.)

Saco Series

The soils of the Saco series are deep and very poorly drained. They have formed from loamy and silty stream deposits that contain strata of clay and very fine sandy material. They occur on the wet flood plains of the southern part of the valley of the Penobscot River.

Here, silt and clay deposits and other wet bottom lands are drained by the river.

All areas are frequently flooded; some are parts of beaver dams that have been built a few years.

The surface layer of the Saco soils is generally very dark gray silt loam. It is friable or slightly sticky and strongly acid to medium acid. The subsoil layers are intensely mottled olive-gray and yellow silt loam, silty clay loam, or fine sandy clay. They are plastic and sticky and slightly acid to neutral.

The native vegetation is mostly willow, alder, elm, soft maple, larch, spruce, and hemlock. Cattails, sedges, and other marsh plants grow in places.

The Saco are the most poorly drained of a group of soils on the flood plains that includes the well-drained Hadley, the moderately well drained to somewhat poorly drained Winooski, and the poorly drained Limerick.

The Saco soils have a poor capacity to absorb water. They have a good capacity, however, to hold and supply water.

Profile of Saco silt loam on a 1 percent slope in a pastured area:

A_p 0 to 5 inches, very dark gray (N 3/) silt loam; strong, medium, granular structure; friable or slightly sticky; strongly acid; abrupt, smooth lower boundary.

C_1 5 to 10 inches, silt loam mottled with olive gray and yellow; strong, medium, platy structure; slightly sticky and plastic; strongly acid; clear, irregular lower boundary.

C_{2g} 10 to 30 inches, silt loam intensely mottled with olive gray, yellow, and brown; massive or weak, thick, platy structure; very plastic or sticky; medium acid; clear, wavy lower boundary.

C_{3g} 30 to 34 inches +, fine sandy clay loam or sandy and silty layers mottled with dark olive gray and pale yellow; plastic and sticky; slightly acid to neutral.

Although a typical profile of the Saco soils is difficult to describe because of the variation in materials, this profile is representative of most of the soils in the southern part of the valley of the Penobscot River. Most areas of the Saco soils are medium or fine textured. The texture of the surface layer ranges from silt loam to loam. The subsoil contains fine sand, as well as thin streaks of gravel or of silty clay.

Saco silt loam (Sa).—This soil has a profile that in most places is similar to that described for the series. It is nearly level and has very little runoff. It is wet most of the year, and some areas are flooded in spring for several weeks, or more.

Included with this soil are knolls of gravel and sand that were deposited by the streams.

This soil is generally too wet to clear. Some of the less wet areas are pastured, and a few acres in fields of better soils are in hay. The soil is usually marshy where beaver and man-made dams back up the water. These marshy areas can be used only for wildlife and recreation.

This soil is best used for the production of pulpwood. Good stands of spruce and other softwoods occur in many areas. These are more suitable for pulpwood than for sawtimber because mature or large trees are shallow rooted and easily blow over. Most areas are too wet to drain, but corduroy roads and light equipment will help cutting operations on this soggy soil. (Capability unit VIIw-6.)

Scantic Series

The soils of the Scantic series are poorly drained and very deep. They have formed from marine and lacustrine deposits of silt and clay. The upper layers are light-gray silt loam. They are friable and strongly acid. The subsoil layers are silty clay loam or silty clay and are mottled gray, olive gray, yellow, and grayish brown to bluish gray. They are sticky and very plastic. The Scantic soils are extensive in the southern part of the valley of the Penobscot River near Brewer, Bradley, and Orono.

The native vegetation is spruce, fir, hemlock, and larch. Birch and maple also occur in the stands where the drainage is not too poor.

The Scantic soils are the poorly drained members of a group of soils that have formed on fine-textured materials. This group includes the well-drained Suffield, the moderately well drained to somewhat poorly drained Buxton, and the very poorly drained Biddeford soils. The Scantic soils resemble the Monarda soils, which have developed on glacial till, but they lack coarse fragments. In some characteristics the Scantic are also similar to the Red Hook soils, but they have a finer texture and do not have sandy or gravelly streaks in the subsoil.

The Scantic soils are low in natural fertility. They are medium to slightly acid.

Profile of Scantic silt loam on a 1 percent slope in a pastured area:

A_p 0 to 7 inches, grayish-brown (2.5Y 5/2) silt loam; weak, medium, granular structure; friable; slightly sticky when wet; strongly acid; abrupt, smooth lower boundary.

A_{2g} 7 to 14 inches, gray (5Y 5/1) silt loam; moderate, medium, platy structure; sticky and plastic; strongly acid; abrupt, wavy lower boundary.

B_{21g} 14 to 22 inches, silty clay loam strongly mottled with olive gray (5Y 5/2), olive yellow (5Y 6/8), and pale olive (5Y 6/3); strong, thin, platy structure; sticky and plastic; medium acid; clear, wavy lower boundary.

B_{22g} 22 to 42 inches, silty clay loam intensely mottled with olive, olive brown, yellow, and dark brown; strong, medium, platy structure; slightly acid; gradual, wavy lower boundary.

C_g 42 to 51 inches +, dark-gray (5Y 4/1) silty clay; massive; very plastic; neutral.

The intensity of mottling in the subsoil varies from place to place. The silty and clayey material also varies from many feet to 2 or 3 feet in thickness and overlies gravel, sand, or glacial till, as well as bedrock.

Scantic silt loam, 0 to 8 percent slopes (ScB).—This soil has a profile similar to that described for the series. It is nearly level to gently sloping or undulating and has slow runoff. The capacity of the soil to absorb water is low, but the capacity to supply and hold it is good. The water table is frequently near the surface but recedes during most of the summer. Some areas of thin, sandy deposits and some gravel and stones are included with this soil. These areas occur where this soil is adjacent to glacial outwash and stony upland.

Much of Scantic silt loam, 0 to 8 percent slopes, is wooded and produces many cords of pulpwood each year. A large part is in pasture or hay, for which it is well suited. Because of its texture and lack of drainage, it is not well suited to tilled crops or orchards. It is not very responsive to tile drainage, as the lateral movement of

water in the silt and clay subsoil is slow. This soil is a good filler for ponds. (Capability unit IVw-7.)

Stetson Series

The soils of the Stetson series are well drained or somewhat excessively drained and are very deep. They have formed from sandy and gravelly glacial materials that include noticeable quantities of phyllite, shale, slate, and quartzite, as well as some granite. The surface layer is yellowish-brown sandy loam or gravelly fine sandy loam. It is very friable to friable and strongly to medium acid. The subsoil layers are yellow to pale-brown fine sandy loam to gravel. They are friable to loose and medium to slightly acid.

The Stetson soils occur in many places as narrow areas on the eskers. They also occur where glacial outwash was deposited by meltwater—chiefly along the basin of the Penobscot River and its tributaries. They are most common in the southern and eastern wings of the county, where small kames and deltas are prominent.

The native vegetation consists of a lot of white pine and some red pine, red spruce, fir, and birch. Maple, aspen, and oak are scattered throughout the stands. Their distribution depends on the texture and consistence of the soil.

The Stetson soils are the well drained to somewhat excessively drained members of a group of soils on glacial outwash. This group includes the moderately well drained to somewhat poorly drained Machias soils and the poorly and very poorly drained Red Hook and Atherton soils. In many places the Stetson soils are also adjacent to excessively drained Colton soils. In other places they are adjacent to the stony and bouldery soils of the upland.

The Stetson soils absorb water rapidly. Their capacity to hold and supply water is fair to good. They are generally low in fertility and need heavy applications of complete fertilizer and lime. Split applications of nitrogen should be applied during the cropping season for best results.

Profile of Stetson fine sandy loam on a 3 percent slope in a cropped area:

A_p 0 to 6 inches, dark yellowish-brown (10YR 4/4) fine sandy loam; weak, coarse, granular structure; very friable; very strongly acid; 0 to 5 percent coarse fragments; abrupt, smooth lower boundary.

B_{21} 6 to 8 inches, dark-brown (7.5YR 4/4) fine sandy loam; weak, fine, granular structure; friable; strongly acid; 0 to 5 percent coarse fragments; abrupt, irregular lower boundary.

B_{22} 8 to 18 inches, yellowish-brown (10YR 5/4) fine sandy loam; weak, medium, granular structure; friable; medium acid; 0 to 5 percent coarse fragments; clear, wavy lower boundary.

B_3 18 to 24 inches, pale-yellow (2.5Y 7/4) sandy loam; structureless; very friable; medium acid; contains coarse fragments; clear, wavy lower boundary.

D 24 to 54 inches +, olive-gray (5Y 4/2) coarse sand and fine and coarse gravel; stratified; loose; medium acid to slightly acid; 70 to 80 percent coarse fragments.

The texture of the surface soil ranges from loam to gravelly fine sandy loam. The texture of the subsoil ranges from fine sandy loam to loamy fine sand. The depth to gravel ranges from 16 to 34 inches. Scattered fine pebbles to layers of coarse gravel occur. The consistence ranges from very friable to firm in the upper layers but is generally loose in the lower ones. The reaction ranges from strongly acid to medium acid in the surface layer. However, in the very deep gravel (10 feet or more), the pebbles have calcite coatings.

The Stetson soils are similar to the Colton soils in the substratum, but their upper layers are finer textured and lack gravel in places. In some places they resemble the Melrose soils in the first 2 feet, but generally they are coarser textured.

Some areas of Stetson soils are mapped in complex with Suffield soils.

Stetson fine sandy loam, 0 to 2 percent slopes (SeA).—This soil has a profile similar to that described for the series, except that the depth to gravel may be nearer 30 inches (fig. 18). It is a well drained, very deep soil on glacial outwash. It occurs on flat tops of glacial terraces, generally along the basin of the Penobscot River and along the eskers where small deltas formed from glacial meltwater.

Figure 18.—**Profile of Stetson fine sandy loam showing dark surface layer (A_p) and gravel at 34 inches.**

Small spots of moderately well drained or somewhat poorly drained Machias soils are included with this soil.

This nearly level Stetson fine sandy loam is almost all in crops, mainly potatoes and beans and other vegetables. It is well suited to tilled crops, pasture, hay, small fruit, and nursery stock. It is not so well suited to orchards, because of a lack of air drainage. Apples may be grown, however, where there is enough air drainage to avoid frost. Applications of complete fertilizer and lime have good results on this soil. Split applications of nitrogen are more effective than one large application. Amounts to apply should be determined by field tests and the needs of the crops grown. (Capability unit I-5.)

Stetson fine sandy loam, 2 to 8 percent slopes (SeB).—This soil has a profile similar to that described for the series. It has undulating relief; but since the rainfall is absorbed, runoff is negligible. This soil occurs only on the tops of glacial outwash terraces and eskers. It is most common in Carmel, Kenduskeag, and other central-eastern and western towns along the basin of the Penobscot River.

Small spots of moderately well drained Machias soils are included with this soil. Also included are areas near the very stony upland that contain scattered boulders.

This Stetson fine sandy loam is about half in crops and half in woods. It is suited to nearly all the crops in the county except apples. Where there is enough air drainage, however, apples can be grown. Erosion is usually not a problem on this soil. In some years, however, the subsoil remains frozen in spring, and there is some surface erosion until it thaws.

Applications of complete fertilizer and lime produce good results on this soil. Small, repeated applications of nitrogen are more effective than a single large one. Amounts to apply should be determined by soil tests and the needs of the crops to be grown. (Capability unit IIe–5.)

Stetson fine sandy loam, 8 to 15 percent slopes (SeC).—This soil has a profile similar to that described for the series. It is very deep, well-drained soil from glacial outwash. It occurs along the sides of eskers and on the borders of glacial terraces where the relief is somewhat rolling. Because it absorbs water very rapidly, this soil has only medium runoff. Erosion, consequently, is negligible and usually can be controlled by simple practices.

This soil includes areas of cobbly and stony knolls where coarser materials have been deposited. It also includes areas near the upland that contain scattered bedrock outcrops.

About half of Stetson fine sandy loam, 8 to 15 percent slopes, is wooded and half is in crops and pasture. It is suited to most of the crops grown in the county, including apples. The soil may be dry part of the summer, however.

Heavy applications of complete fertilizer and lime produce good results on this soil. Nitrogen is more effective if part of the application is made in spring, and part during the growing season. (Capability unit IIIe–5.)

Stetson fine sandy loam, 15 to 25 percent slopes (SeD).—Except in wooded areas, this soil has a profile similar to that described for the series. In wooded areas it has a mat of organic material about 3 inches thick. This is underlain by 2 or 3 inches of light-gray fine sandy loam and 2 or 3 inches of strong-brown, firm fine sandy loam. The other characteristics are as described in the representative profile. This soil is moderately steep or hilly and has moderately rapid runoff. It occurs along the sides of the eskers and on the escarpments of the glacial terraces in the central part of the county.

Some areas with a few, scattered bedrock outcrops and some with knolls of stones and boulders are included with this soil.

This soil is mostly wooded. It supports good stands of white pine and some aspen and birch. It is generally too steep for crops and too dry for pasture. Cane fruit can be grown. Because of the slopes, however, a woodland cover is the best protection for this soil. (Capability unit IVe–5.)

Stetson-Suffield complex, 0 to 15 percent slopes (SfC).—The soils of this complex have profiles similar to those described for their respective series. In some places the profiles of the two soils are found only a few feet apart. In others sandy and clayey pockets are intermingled in the kames or in eskerlike deposits that were laid down in channels cut in the melting glacial ice.

The soils in this complex are deep and well drained. They have formed in deposits of sandy and gravelly outwash interspersed with silt and clay. Usually they are free of stones and boulders and are largely sand or loamy fine sand and silt and clay. In most areas they are more than 20 feet deep to bedrock.

This complex of soils has nearly level to sloping or rolling relief, and has slow to medium runoff. It occurs along the southern part of the valleys of the Kenduskeag and Penobscot Rivers. It also occurs in a few places near Mattawamkeag in the northern part.

Areas with a few, scattered outcrops of bedrock are included with this complex, especially where streams have cut away the soil.

This complex of soils is about half forested and half cleared. A large part of the cleared acreage is in crops; the rest is in pasture and hay. The soils are suited to most crops grown in the county. Corn, oats, potatoes, beans, peas, and berries grow well, as do grass and clover and other legumes. Grass and grain, however, grow best on the fine-textured areas, and tilled crops on the sandy areas. The soils are also suited to orchards, but these grow better on the sloping and rolling areas than on the nearly level areas. Good stands of white pine, maple, oak, and beech are common on these soils and are usually cut for timber.

This complex of soils is moderately productive, but tilled crops require limited applications of lime and heavy applications of complete fertilizer. Additional nitrogen is needed on the sandy places during the growing season. Erosion control practices are needed in tilled areas that have slopes exceeding 8 percent. (Capability unit IIIe–5.)

Stetson-Suffield complex, 15 to 45 percent slopes (SfE).—The soils of this complex have profiles similar to those described for their respective series. In some areas the profiles of the two soils are found only a few feet apart. Some of the kames and eskers, however, have sand and gravel on one side and silt and clay on the other. The contrast between the coarse-textured and fine-textured soils is more pronounced in this complex than in the one on less steep slopes. The soils in this complex are very deep and well drained. They have hilly to very steep relief and very rapid runoff.

Areas with a few, scattered outcrops of bedrock are included with this complex.

This complex is nearly all wooded. It has good stands of white pine, spruce, and maple. Some beech and oak trees are scattered in the stands. A few acres that occur in areas of better soils are in pasture or hay. Many sand and gravel pits are dug in the kames and eskers. Cultivated areas would be erodible and would need complex conservation practices. (Capability unit VIe–5.)

Stony Land

Stony land, Hermon material, strongly sloping (ShD).—This miscellaneous land type is deep, excessively stony, and somewhat excessively drained. It is covered by boulders of granite, several feet through, and many smaller stones of both granite and other material. In many places near the East Turner Mountain area and around Lake Millinocket, the boulders are piled into huge mounds. The soil of this land type, where it can be ex-

amined, has a profile similar to that described for the Hermon series.

This land type has formed from loose, bouldery, granitic glacial till. It occurs on very steep slopes of the upland in the northern part of the county near Millinocket, Katahdin Lake, and Lunksoos Mountain. It also occurs in the Lunksoos Mountain area as part of the deep troughs or small canyons that are cut into the mountains and high hills by streams.

Areas of very stony, marshy depressions are included with this land type.

All of this land type is wooded. It supports thin stands of maple, birch, beech, red and white oak, white pine, and red spruce. Where there are fewer boulders, scattered ash and poplar are in the stands. The trees are in good condition, but because of boulders, they are usually difficult to cut and haul away. Reseeding and regrowth is slow on this land type. In some places the trees have no commercial value. This land type is best suited to recreational use and to wildlife habitats. (Capability unit VIIs–3.)

Stony land, Plaisted material, strongly sloping (SpD).—This is a moderately deep, well drained, and extremely stony miscellaneous land type of the upland. The surface is thickly covered with granite boulders, 4 to 5 feet, or more, in diameter, as well as with smaller stones. It is therefore difficult to make a boring to examine a profile in this land type. In general, however, the profile resembles that described for the Plaisted series, except for the surface stones and the absence of a plow layer.

This land type is strongly sloping and has rapid runoff. It occurs only in the mountains in the southeastern and northwestern corners of the county.

Included with this land type are some seepage spots and some areas with rock outcrops. Also included are areas of better soils.

This land type is nearly all wooded, but the stands are thinner than on the very stony Plaisted soils. The piles of rocks and boulders in some areas have only a thin growth of mixed hardwoods and softwoods. Such areas are best suited to recreation or wildlife habitats, as the trees are difficult to harvest. Timber can be more easily removed, however, from some of the less stony areas. (Capability unit VIIs–3.)

Suffield Series

The soils of the Suffield series are very deep and well drained. Generally they have moderately slow permeability. They have formed from marine and lacustrine silt and clay deposits. The surface soil is very dark brown, dark grayish-brown, or grayish-brown silt loam, very fine sandy loam, or sandy loam. It is friable to firm and strongly acid to medium acid. The subsoil is light-gray to pale-brown silt loam or silty clay loam. It is firm to very firm and slightly acid to neutral.

The Suffield soils are most extensive in the southern part of the valleys of the Penobscot and Kenduskeag Rivers. They are generally in areas below 200 feet in elevation and are near the towns of East Corinth, Bangor, Orono, and Old Town.

The native vegetation was white pine, spruce, fir, and other softwoods and maple and aspen. Most of the Suffield soils, however, are now cleared and are used for hay or pasture.

Soils near the Suffield soils that have also formed from silt and clay are the moderately well drained to somewhat poorly drained Buxton, the poorly drained Scantic, and the very poorly drained Biddeford. The well-drained Melrose and moderately well drained Elmwood soils are also in the same area as the Suffield soils.

The Suffield soils need large amounts of nitrogen. Supplies of phosphate, potash, and lime are more nearly adequate, but most crops need applications of these also. The amounts used should be determined by the kind of crop grown and the results of soil tests.

Profile of Suffield silt loam on a 2 percent slope in a pasture:

A_p 0 to 7 inches, very dark brown (10YR 2/2) silt loam; weak, fine, granular structure; very friable; pH 5.5; abrupt, smooth lower boundary.

B_2 7 to 12 inches, yellowish-brown (10YR 5/4) silt loam; weak, medium, platy structure; friable; pH 5.5; clear, wavy lower boundary.

B_3 12 to 20 inches, grayish-brown (2.5Y 5/2) silty clay loam; weak, thin, platy structure; firm; pH 5.5; gradual, wavy lower boundary.

C_1 20 to 32 inches, grayish-brown (10YR 5/2) silty clay loam; moderate, medium, subangular blocky structure; very firm; medium acid; gradual, wavy lower boundary.

C_2 32 to 72 inches, dark yellowish-brown (10YR 4/4) silty clay; strong, medium to coarse, subangular blocky structure; very firm; slightly acid to neutral.

The texture of the surface soil is silt loam in most areas, but the range is from fine sandy loam to silt loam in areas adjacent to soils having a sandy surface soil. Where the surface soil is fine sandy loam, it is a few inches to about a foot deep over the silty and clayey subsoil. Except for a few scattered pebbles in their profile, the Suffield soils lack the coarse fragments characteristic of nearly all the other soils on terraces or uplands (fig. 19).

Suffield silt loam, 0 to 2 percent slopes (SuA).—This soil has a profile similar to that described for the series. It is nearly level and has slow runoff. It absorbs water slowly, but it has a good water-holding capacity and a fair water-supplying capacity. It usually occurs in small areas on the tops of the marine and lacustrine terraces near dissecting streams.

Small spots of the moderately well drained Buxton soils are included with this soil.

Most of Suffield silt loam, 0 to 2 percent slopes, is cleared and in pastures or hay. This soil produces good stands of bluegrass and clover, trefoil, and other legumes. It is not suited to orchards, because of the tight clay substratum. The fine texture and slow permeability of this soil limit the crops that can be grown. A few acres, however, are in corn and beans.

Single applications of complete fertilizer and lime in spring are usually enough for the crops grown. Top dressings are beneficial to pasture and hay. The amount of fertilizer and lime used should be determined by soil tests and the needs of the plants grown. The wooded areas on this soil support good stands of white pine, spruce, maple, elm, and beech. Birch and aspen are scattered through the stands. (Capability unit IIe–7.)

Suffield silt loam, 2 to 8 percent slopes (SuB).—This soil has a profile similar to that described for the series. It is very deep and well drained, is gently sloping, and has medium runoff. This soil occurs on the crests of marine and lacustrine terraces that are dissected by streams. The elevation is below 200 feet. Most areas

Figure 19.—**Profile of Suffield silt loam showing silt and clay faces. Note the lack of coarse fragments. The rule shown is 60 inches long.**

are in the southern part of the valleys of the Kenduskeag and Penobscot Rivers, near Hampden, Bangor, Orono, Levant, and East Corinth.

Included with this soil are small spots of moderately well drained Buxton soils and scattered areas with boulders or stone clumps.

Most of Suffield silt loam, 2 to 8 percent slopes, is cleared. The largest areas are in pasture and hay; clover and timothy and some bluegrass and birdsfoot trefoil are grown. Large acreages, however, are in tilled crops, principally berries, oats, and canning corn, beans, and other vegetables. This soil is not suited to orchards, because of winterkilling. North of Bangor, however, some apple orchards produce moderate yields.

Applications of lime and complete fertilizer in spring are usually adequate for these soils. The amounts used should be determined by soil tests and the crops grown. (Capability unit IIe–7.)

Suffield silt loam, 8 to 15 percent slopes (SuC).—This soil has a profile similar to that described for the series, except that in many areas the surface layer is thinner. The soil is sloping and has rapid runoff. Most areas occur along the crests of the marine and lacustrine silt and clay terraces where dissecting streams are active. Some areas occur on the banks of streams where the slopes are not steep. The largest areas are in the southern part of the valley of the Penobscot River and along the Kenduskeag River near East Corinth and Levant. Smaller areas are scattered throughout the central part of the county, generally at elevations below the 250 feet. Areas with a few, scattered rock outcrops, boulders, or stone clumps are included with this soil.

Most of Suffield silt loam, 8 to 15 percent slopes, is cleared. About half of the cleared acreage is in crops and half in pasture. The soil is best suited to hay, oats, and pasture; it is less well suited to corn and beans and other vegetables. It is fairly well suited to berries but is unsuitable for orchards.

Erosion control practices are needed in all tilled areas. Lime and complete fertilizer are also needed. The amounts used should be determined by soil tests and the needs of the crops grown.

Good stands of mixed northern hardwoods grow on the wooded areas. The trees are white pine, spruce, maple, elm, and beech. Birch and aspen are scattered through the stands. (Capability unit IIIe–7.)

Suffield silt loam, 8 to 15 percent slopes, eroded (SuC2).—This soil has a profile similar to that described for the series, but most of the silt loam upper horizons have been removed by erosion, and some of the silty clay subsoil is exposed. The soil is sloping and has rapid runoff. It occurs most frequently in many places along small streams that have dissected the gently rolling silt and clay terraces in the southern part of the county.

This soil was cleared and used for crops and pasture. Most of it is now in grass, and some is idle. This soil is highly erodible. Erosion control practices are needed on cultivated areas. Lime and complete fertilizer should be applied in amounts determined by soil tests and the needs of the crops grown. (Capability unit IVe–7.)

Suffield silt loam, 15 to 25 percent slopes (SuD).—This soil has a profile similar to that described for the series, but the plow layer is thinner. The soil is moderately steep and has rapid runoff. It occurs mostly in the southern parts of the valleys of the Penobscot and Kenduskeag Rivers, where tributary streams are cutting into the silt and clay deposits.

Included with this soil are some areas with scattered outcrops and some with gravelly or sandy pockets.

Suffield silt loam, 15 to 25 percent slopes, is best suited to pasture, hay, small grain, and small fruit. It is not well suited to row crops or to apples, although a few acres of both are planted. Cultivated areas are erodible and require complete conservation practices. (Capability unit IVe–7.)

Suffield silt loam, 15 to 25 percent slopes, eroded (SuD2).—This soil has a profile similar to that described for the series, but most of the silt loam surface soil has been removed by erosion. In some spots the silty clay substratum is exposed. The soil is moderately steep and has rapid runoff. It occurs mostly in the valleys of the Penobscot and Kenduskeag Rivers, where tributaries are cutting into the silt and clay deposits.

Included with this soil are small severely eroded areas that originally had a very fine sandy loam surface soil.

Suffield silt loam, 15 to 25 percent slopes, eroded, is better suited to grass than cultivated crops. It is very erodible, and conservation measures are required in tilled areas. (Capability unit VIe–7.)

Suffield silt loam, 25 to 45 percent slopes (SuE).—This soil has a profile similar to that described for the series, but the surface layer is quite thin in places. In many places deep gullies are common and the silty clay substratum is exposed. The soil is very steep and has very rapid runoff. It occurs primarily along the southern part of the valleys of the Penobscot and Kenduskeag Rivers, where entrenching streams and cut banks are numerous.

Some areas with scattered rock outcrops and some with gravelly or sandy pockets are included with this soil.

This soil is too erodible for tilled crops. It is best suited to pasture or forest. A few acres included with better soils are in orchards. (Capability unit VIe–7.)

Suffield very fine sandy loam, 0 to 2 percent slopes (SvA).—This soil has a profile similar to that described for the series, except that the upper two horizons are very fine sandy loam instead of silt loam. It is a very deep, well-drained soil on silt and clay deposits. It is nearly level and has slow runoff. It absorbs water slowly. The water-holding capacity is good, and the water-supplying capacity is fair. This soil occurs on the crests and tops of the marine and lacustrine terraces near dissecting streams. It is mostly in the southern part of the valleys of the Kenduskeag and Penobscot Rivers, near Levant, Hampden, Bangor, and Veazie.

A few scattered bedrock outcrops are included with this soil in areas near streams. Also included are areas with boulders and stone clumps on the surface.

All of Suffield very fine sandy loam is cleared. Most of it is in pasture and hay, for which it is well suited. Some of the acreage is used for corn, oats, potatoes, truck crops, and berries. It is suited to these crops if it is limed and fertilized. It is not suited to orchards. Orchards are subject to extensive winterkilling because of the clayey and silty substratum. (Capability unit IIe–7.)

Suffield very fine sandy loam, 2 to 8 percent slopes (SvB).—The upper layers of this soil are brown and light yellowish-brown very fine sandy loam to a depth of about 12 inches. This material is underlain to a depth of several feet by silty clay loam, which is pale brown and gray, mottled with brown (see fig. 19). In consistence and structure, the lower horizons are similar to corresponding horizons in the profile described for the series. This soil is very deep and has formed from silt and clay deposits in the lower basin of the Penobscot River.

Areas with a few bedrock outcrops are included with this soil near entrenching streams. Also included are areas where there are scattered boulders and stone clumps on the surface.

Suffield very fine sandy loam, 2 to 8 percent slopes, has been cleared and is in pasture and hay. It is well suited to these uses. It is also suited to corn, oats, potatoes, truck crops, and berries. Erosion control practices, however, must be used in all areas used for row crops. The soil quickly erodes unless properly handled. It is not suited to orchards because the silt and clay subsoil causes extensive winterkilling. (Capability unit IIe–7.)

Suffield very fine sandy loam, 8 to 15 percent slopes (SvC).—This soil is similar to Suffield very fine sandy loam, 2 to 8 percent slopes, except that the total thickness of the sandy upper layers is usually 8 inches or less. The soil is sloping or gently rolling, and runoff is rapid. It occurs along the sides of the stream valleys that have been cut into silt and clay deposits. It is in the southern part of the valleys of the Kenduskeag and Penobscot Rivers, where the silt and clay terraces have sandy surface layers, especially near Bangor, Hampden, and Veazie. Near entrenching streams, areas with a few bedrock outcrops are included with this soil. Also included are areas where scattered boulders or stone clumps are on the surface.

This Suffield very fine sandy loam is nearly all cleared. It is mainly in hay and pasture, but some of the acreage is in corn and potatoes and beans, peas, and other vegetable crops. It is erodible because of the slopes and the fine texture. Erosion control measures are needed in tilled areas, particularly where the very fine sandy loam surface layer is only a few inches thick. This soil is not suited to orchards. Trees are winterkilled because of the silt and clay subsoil. (Capability unit IIIe–7.)

Suffield very fine sandy loam, 15 to 25 percent slopes (SvD).—This soil is similar to Suffield very fine sandy loam, 2 to 8 percent slopes, except that the total thickness of the sandy upper layers is usually only 6 to 8 inches. The soil is moderately steep and has rapid runoff. It occurs along the sides of stream valleys that are cutting into silt and clay deposits. It is in the southern part of the valleys of the Penobscot and Kenduskeag Rivers, where some of the silt and clay deposits have a thin cover of fine sand.

Areas containing scattered bedrock outcrops or occasional boulders or stones are included with this soil.

This Suffield very fine sandy loam is mostly cleared. It is used for hay and pasture and occasionally for a row crop. This soil is erodible, and tilled areas need erosion control. (Capability unit IVe–7.)

Thorndike Series

The soils of the Thorndike series are very shallow to moderately deep and well drained. They have formed from thin, slaty glacial till and in residuum from underlying lime-seamed bedrocks. The bedrock is mostly slate, shale, phyllite and, in the northern part of the county, some calcareous quartzite. The upper layers in tilled areas are grayish brown, very friable or friable, and very strongly to strongly acid. The subsoil is pale brown or dark brown, friable, and strongly acid to medium acid. In wooded areas the upper layers include a mat of forest litter and a light-colored leached layer.

The Thorndike soils are common in the southwestern corner, the central-eastern wing, and the extreme northern part of the county. They are scattered throughout other areas. Rock outcrop, which includes Thorndike soil materials, is common in all of the high and mountainous areas of the central and southwestern parts of the county (see fig. 4).

The native vegetation is northern hardwoods and conifers. There are prominent stands of white-cedar and, in a few places, almost pure stands of white birch. Maple, spruce, fir, aspen, ash, and white pine are also in the stands. The Thorndike soils are shallow members of a group that include the well-drained and very deep Bangor, the moderately well drained to somewhat poorly drained Howland and Dixmont, the poorly drained Monarda, and the very poorly drained Burnham soils. The Thorndike

soils are also in the same areas as the deep, well-drained Plaisted and Perham soils, which have formed from glacial till.

Profile of Thorndike shaly silt loam on a 3 percent slope in a wooded area:

A_0 2 inches to 0, loose mixture of twigs and other forest litter; fibrous.

A_1 0 to 1 inch, very dark grayish-brown (10YR 3/2) silt loam; very weak, fine, granular structure; loose; extremely acid; 30 to 40 percent coarse fragments; abrupt, wavy lower boundary.

A_2 1 to 2 inches, light-gray (10YR 6/1) shaly silt loam; very weak, fine, granular structure; very friable; extremely acid; 30 to 40 percent coarse fragments; abrupt, irregular lower boundary.

B_{21} 2 to 4 inches, strong-brown (7.5YR 5/6) shaly silt loam; weak, coarse, granular structure; very friable; very strongly acid; 50 to 60 percent coarse fragments; clear, irregular lower boundary.

B_{22} 4 to 8 inches, yellow (10YR 7/6) shaly silt loam; weak, coarse, granular structure; friable; very strongly acid; 60 to 70 percent coarse fragments; clear, wavy lower boundary.

B_3 8 to 20 inches, light yellowish-brown (10YR 6/4) shaly silt loam; weak, medium, platy structure; friable, strongly acid; 70 to 90 percent coarse fragments; abrupt, wavy lower boundary.

D_r 20 inches + brownish-yellow, laminated and lime-seamed shale bedrock that is shattered in some places.

The depth to bedrock varies, but it averages about 2 feet. In some areas the bedrock is exposed; in others there are pockets of soil material, 4 or 5 feet deep. The amount of coarse fragments ranges from 10 to 90 percent of the volume. The size ranges from slivers of slate to slabs 3 or 4 inches thick and a foot or so long. Most of the Thorndike soils are a brown or yellowish brown. Some areas in the northern part of the county are reddish yellow in the subsoil.

Thorndike shaly silt loam, 2 to 8 percent slopes (ThB).—This soil has a profile similar to that described for the series. In cleared areas the upper layers are mixed into a dark-brown plow layer. In most places many slivers of shale or slate occur throughout the profile (fig. 20). This well-drained soil of the upland has undulating relief and medium runoff. Outcrops of bedrock are common, but the soil is generally about 2 feet deep.

Small areas of somewhat poorly drained Dixmont and poorly drained Monarda soils are included with this soil. These areas are largely in depressions and in hollows between the outcrops.

This Thorndike shaly silt loam is extensive in the southwestern part of the county, and large acreages are cleared. It is suitable for most crops, orchards, small grain, and small fruit. Since this shaly soil is droughty during summer, it is not so well suited to nurseries, pasture, and hay.

This soil is relatively low in fertility and strongly acid. Complete fertilizer, additional nitrogen, and lime are needed to produce good yields. The amounts to apply should be determined by crop needs and by soil tests. (Capability unit IIe–1.)

Thorndike shaly silt loam, 8 to 15 percent slopes (ThC).—This soil has a profile similar to the one described for the series, except that the proportion of coarse fragments (shale and slate) is higher in places. The upper layers are generally mixed in cleared areas and are a dark-brown shaly silt loam, about 7 inches thick. This shallow soil of the upland has rolling relief and rapid

Figure 20.—**Profile of Thorndike shaly silt loam, 2 to 8 percent slopes. The residual material in the profile consists of many tiny fragments from the underlying lime-seamed rock.**

runoff. It is similar to the undulating shaly silt loam but is more erodible.

Small areas of moderately well drained Dixmont and poorly drained Monarda soils are included with this soil. Some areas containing a few, scattered stones and boulders are also included.

This Thorndike shaly silt loam is suitable for most crops, orchards, small grain, and small fruit. It is not so well suited to pasture and nurseries because it becomes droughty during the summer. It is erodible, but the slopes in many places are so sharp and irregular that erosion control practices are limited to the use of cover crops and long rotations. Conservation practices must be tailored to each field of this soil. It is better to use natural contours and slope breaks than to establish contours at specified distances. Most crops need lime, complete fertilizer, and additional nitrogen. Lime can be omitted on potatoes, and nitrogen on peas. (Capability unit IIIe–1.)

Thorndike shaly silt loam, 15 to 25 percent slopes (ThD).—Except in tilled areas, the profile of this soil is similar to the one described for the series. The surface layer in tilled areas is a dark-brown shaly silt loam, about 7 inches thick. In general the soil mantle ranges in thickness from a few inches near outcrops to 2 feet and includes a high percentage of angular slate and shale fragments. This soil has hilly relief and rapid runoff. It occurs most extensively in the southwestern part of the county along the ridges and low hills of the towns of Newburg, Dixmont, and Etna.

Moderately well drained, moderately deep areas of Dixmont soils are included with this soil. Also included are small stony areas.

This Thorndike soil will grow most crops, orchards, small grain, and small fruit. It is so erodible, however, that most of it is pastured or used for hay. Erosion control practices are hard to establish because of sharp and

irregular contours caused by frequent bedrock exposures. Patches of grass over the bedrock burn out during the summer but will return in spring and fall if there is enough rain. This soil needs complete fertilizer, additional nitrogen, and lime to produce good yields. Potatoes and row crops are not generally grown. (Capability unit IVe-1.)

Thorndike shaly silt loam, 25 to 45 percent slopes (ThE).—This soil has a profile similar to that described for the series, but the percentage of coarse fragments may be higher. Bedrock exposures are common, and some are several feet high. This soil is steep and has very rapid runoff. It is most extensive around the Dixmont hills and other high areas in the southern part of the county. It also occurs in the northern part of the county around small gorges and entrenching streams. Very stony areas and areas containing scattered boulders and stones are included with this soil.

Some of this soil is cleared and is in old hayfields or is idle. The rest produces thin stands of spruce, fir, white-cedar, white birch, and pine. Some maple, aspen, and ash are in the stands. The soil is best suited to the production of pulpwood. Some areas, however, are too steep or too thin and should not be cut. (Capability unit VIe-1.)

Thorndike very rocky silt loam, 2 to 8 percent slopes (TkB).—This soil has a profile similar to that described for the series, but it is very rocky. It is shallow, and the depth to bedrock is rarely more than 12 to 15 inches. Many outcrops occur. This soil is undulating and has medium runoff. Many depressions, where water accumulates, are included with this soil. A few small areas of shallow, poorly drained Monarda and very poorly drained Burnham soils are also included.

This Thorndike soil is mostly wooded and supports thin stands of mixed hardwoods and softwoods. White-cedar and birch are in the stands. This soil is suited to the production of pulpwood, but reproduction and growth are slow. Some areas that have been cut have no value for the production of trees. A few cutover areas are used for pasture. (Capability unit VIs-1.)

Thorndike very rocky silt loam, 8 to 15 percent slopes (TkC).—The profile of this soil is somewhat like that described for the series. It is generally thinner, however, and may have only A_p and B_2 horizons that formed directly on bedrock. The soil is rarely more than 12 to 15 inches deep to bedrock and has many outcrops. Relief is rolling and runoff is rapid. Numerous rocky hollows, where rainwater and seepage water accumulate, are included with this soil. Also included are some areas with stony clumps and sandy pockets; these areas are near glacial outwash material.

The soil is generally wooded, although some cutover areas have been converted to pasture. The soil is best suited to the production of pulpwood. It is too dry for crops and pastures. Even pulpwood can be cut only at long intervals because of the slow reseeding and regrowth of the trees. Little sawtimber is produced because trees of any size blow over. (Capability unit VIs-1.)

Thorndike very stony silt loam, 2 to 8 percent slopes (TvB).—The profile of this soil is similar to that described for the series, except that it is generally deeper and has fewer coarse fragments. In general the depth of the soil mantle is about 2 feet, but it is as much as 4 or 5 feet in places. Only a few bedrock outcrops occur. The surface stones are usually thinly scattered. They are subangular fragments of bedrock and rounded stones and boulders of gneiss, granite, and other hard rocks. In a few places near Mount Chase and the Passadumkeag Mountains, the stoniness is more pronounced. This Thorndike soil has undulating relief and medium runoff.

Small areas of the somewhat poorly drained Dixmont, the poorly drained Monarda, and the deeper well-drained Bangor very stony soils are included with this soil.

All except a few scattered fields of this Thorndike soil are wooded. The soil has good stands of both sawtimber and pulpwood. White pine, white-cedar, spruce, fir, birch, maple, oak, aspen, and ash grow in mixed and nearly pure stands. Hardwoods are dominant where the soil is deepest, and white-cedar grows where it is thinnest. The stones would have to be removed before this soil could be tilled. (Capability unit VIs-1.)

Thorndike very stony silt loam, 8 to 15 percent slopes (TvC).—This soil has a rolling relief and rapid runoff. In most characteristics it is similar to the undulating Thorndike very stony silt loam, but it would be more erodible if cleared.

This soil is mostly wooded, and the stands are good. It is best suited to the production of sawtimber and pulpwood. (Capability unit VIs-1.)

Thorndike very stony silt loam, 15 to 35 percent slopes (TvD).—This soil has a surface mat of forest material, 2 to 3 inches thick. This material is underlain by a 1- or 2-inch layer of very dark brown silt loam. Beneath this is a layer of light-gray silt loam, also 1 to 2 inches thick. Both layers of silt loam are very friable and very strongly acid, and both have strong, medium or fine, granular structure. The lower horizons are much like those described for the series but are less shaly. This soil has hilly relief and rapid runoff. It is more stony than the undulating Thorndike very stony silt loam and would be much more erodible if cleared.

Small areas of the moderately well drained Dixmont soils on deeper materials, and of the poorly drained Monarda soils in depressions and hollows, are included with this soil.

This Thorndike soil is best suited to pulpwood and sawtimber. It is too steep to clear for row crops, but it could be cleared for pasture. (Capability unit VIs-1.)

Winooski Series

The Winooski soils occur on the flood plains. They are moderately well drained except in shallow depressions and old, filled-in stream meanders. In such places they are somewhat poorly drained. The surface soil is silty and dark grayish brown. It is friable and has strong, medium, granular structure. The subsoil is generally silty, but in some areas it has thin streaks of very fine sand. In most places it is dark brown or dark grayish brown and has pale-brown and yellowish-brown distinct, medium mottles. The mottles are more common in the lower part of the subsoil. In most areas the subsoil is friable, but in some it is firm. Below about 20 inches, the substratum is mixed fine sand and silt. It is usually mottled grayish brown, gray, and pale olive. In a few places some fine gravel is in the mixture.

The native vegetation consists of mixed hardwoods and softwoods. The stands include willow, alder, aspen, soft maple, and hemlock, as well as spruce and fir.

The Winooski soils are associated with the well-drained Hadley soils on the flood plains. When flooded, they drain less readily than the Hadley soils. The Winooski are also in the same areas as the poorly drained Limerick and the very poorly drained Saco soils. They are in the more nearly level areas back of the natural levees, whereas the Limerick and Saco soils are in the slack-water areas. The Winooski soils also occur near the sandier, well-drained Ondawa and the moderately well drained Podunk soils.

Profile of Winooski silt loam on 2 percent slopes in a pasture.

A_p 0 to 7 inches, very dark grayish-brown (10YR 3/2) silt loam; strong, medium, granular structure; friable; strongly acid; abrupt, smooth lower boundary.

C_1 7 to 15 inches, dark-brown (10YR 4/3) silt loam; weak, medium, granular structure; friable; strongly acid; abrupt, wavy lower boundary.

C_{2g} 15 to 22 inches, dark grayish-brown (2.5Y 4/2) silt loam; distinct, medium mottles of pale brown and yellowish brown; mottles common in the lower part; weak, medium, granular structure; friable; medium acid; clear, wavy lower boundary.

C_{3g} 22 to 36 inches, silt loam mottled with grayish brown and light yellowish brown; contains streaks of fine sand; weak, medium, platy structure (or laminated); firm; medium acid; clear, wavy lower boundary.

Winooski silt loam (Wn).—In general this soil has a profile similar to that described for the series. It is deep and moderately well drained to somewhat poorly drained. It occurs mostly in the southern part of the basin of the Penobscot River, where silt and clay deposits are numerous. The soil has formed in low swales next to the upland, where water may lie for several days after the spring floods recede.

Included with this soil are spots of poorly drained Limerick and very poorly drained Saco soils.

Much of this Winooski soil is pastured. Its best use is for pasture and hay. If the soil does not flood during the cropping season, it is well suited to corn, oats, beans, and small fruit. It is not suited to orchards or to special crops that require good drainage.

This soil needs lime and complete fertilizer to produce good yields of crops or pasture. The amounts should be determined by soil tests and the needs of the crops or grasses to be grown. (Capability unit IIw–6.)

Genesis, Classification, and Morphology of Soils

Factors of Soil Formation

At any given place on the earth, the climate, parent materials, living organisms, topography or relief, and time affect the soil mantle. All five factors affect the soil at any one place, but not all are equally important everywhere.

Climate.—Penobscot County is in the temperate zone and has a cool and humid climate. The winters are long and have much snow, and the summers are short. The annual precipitation is about 40 inches per year. The rainfall is well distributed throughout most of the warm months except July and August, which may be dry in some years. This cool, moist climate, with the type of vegetation it favors, has been effective in producing Podzol and Brown Podzolic soils in the county.

Penobscot County has not always had a temperate climate. Before the present climatic conditions, intermittent long periods of frigid climate persisted. During these periods continental glaciers formed and covered extensive areas with thick ice sheets. The latest of these ice sheets, the Wisconsin glacier, was probably more than 5,000 feet thick. It melted from the county about 10,000 years ago. The parent materials of the soils in the county were influenced greatly by the glaciers.

Parent material.—The glacial ice mass ground up and moved large quantities of soil and rock material. Most of this material was of local origin, but some of the stones, gravel, and finer particles were brought in from long distances. When the ice melted, huge volumes of water poured into the valley of the Penobscot River and tributary valleys. The water moved through these valleys into the ocean or formed hundreds of lakes and ponds. Some of the lakes and ponds are still in existence, and others are now peat and muck bogs. As the waters receded, the streams formed their present channels and flood plains by cutting through many of the glacial deposits. Several soils formed on these flood plains; these soils range from silty to coarse sandy and gravelly in texture.

The meltwater from continental glaciers raised the level of the ocean. At this high level, the ocean extended into the southern part of the valley of the Penobscot River. Silt and clay deposits laid down in this part of the valley are the parent materials in which the Suffield, Buxton, Scantic, and Biddeford soils later formed. Along with the final melting of the ice, the depressed land surface raised, and the waters drained out of the area now occupied by these soils. Other areas of silt and clay occur in the central and eastern parts of the county, where temporary ponds were caused by ice dams that later melted. The only remaining existence of these ponds are the areas of fine-textured soils overlying coarser glacial outwash and till.

The glacial till, of Wisconsin Age, is the largest source of parent materials in the county. It consists of mixed boulders, stones, rocks, and gravel in a matrix of finer materials that include silt and clay. The glacial tills in Penobscot County are not sharply defined, but in general they are silty, loamy, and sandy. The three major soils of the upland—Bangor, Plaisted, and Hermon—reflect, in the order given, the increasing coarseness of material in the soil.

The silty materials are primarily from lime-seamed slate and shale; the loamy materials from mixed granite, slate, and phyllite; and the sandy materials primarily from granitic rocks. Sandstone, calcareous quartzite, phyllite, conglomerate, and diorite are included in the glacial till in widely varying proportions.

The glacial till is uneven in thickness and composition. In many areas the bedrock is widely exposed, and the soils have formed on a thin mantle of till that is mixed with broken material from underlying bedrock. Areas where the materials are basically sedimentary rock, some of which is lime-seamed, are generally occupied by Thorndike soils. Areas where the materials are acid and

granitic are generally Canaan soils. Some of the bedrock exposures are without soil profile development and are essentially parent materials. These are usually without vegetation. Horse, Sugar Loaf, and Little Peaked Mountains are examples of such areas.

In some places the glacial till is deep. The deep till near Drew and Patten, and at one or two other places in the northern or northeastern parts of the county, is finer textured and browner in color than elsewhere. The proportion of silt and clay is high, and the rock materials within the soil are softer and more weathered than in the loamy or sandy tills of the Plaisted or Hermon soils.

The glacial outwash consists of silt, fine sand, sand, gravel, and cobblestones. A large percentage of these materials originated from slate, shale, quartzite, and granite. In a few places, the granitic materials are predominant, especially near Millinocket Lake, in the towns of Clifton, Lakeville, and Whitney, and in some of the cobbly eskers near Enfield. In other places the materials are overwhelmingly lime-seamed shale, slate, and phyllite, and calcite coatings are on many pebbles at a depth of 8 to 15 feet in the outwash. Large glacial outwash terraces filled parts of the stream valleys and adjacent lowlands. Eskers, or horsebacks, caused by the tunnelling of streams through the ice, wind conspicuously across the uplands as well as the lowlands. The finer outwash consists mostly of very fine sandy deposits that overlie silt and clay at a depth of 6 to 30 inches. These deposits are mostly in the southern part of the county.

Living organisms.—Immediately following the recession of the glacier, the vegetation on land was limited to bushes, lichens, and mosses. Hydrophytic plants grew in the many marshes and lakes of the lowlands. As time passed, the land areas were covered by the early forests of the northern temperate zones. These forests consisted of hardwoods, conifers, and mixed stands, depending on the relative drainage and aeration of the soils then developing. The main hardwoods were maple, birch, and beech and some oak and ash; the main conifers were spruce, fir, hemlock, and white pine. Larch is now common in the bogs, and aspen on the uplands. These trees, however, became established after the others.

With the growth of vegetation, the soil materials began to weather. Decomposition of organic matter yielded organic acids, which percolated through the soil. This organic solution, along with the climate and relief, acted on the parent material and caused chemical and physical changes in the soils. These changes are reflected in the horizons, or layers, that can be observed in most soils when a vertical cross section (profile) is cut. The arrangement, thickness, color, consistence, structure, and other chemical and physical characteristics of these horizons are used as the basis for identifying and classifying soils.

Relief.—The relief of the county ranges from steep mountains to flat swamps. The shape of the land surface, the slope, and the height of the water table have had a great influence on some of the soils of this county. In places like Horse Mountain or Sugar Loaf, slopes are steep and there is little vegetation. As a result, soil and weathered rock are easily dislodged, and much of this material is gradually removed by wind, water, and gravity. In such places, soil development proceeds at extremely slow rates and the soils derive their characteristics mainly from the effects of parent material and relief. Soils of this county that are nearly level or gently sloping and well drained are not so strongly influenced by relief and parent material. The effects of climate and living organism are dominant on such soils.

Time.—Parent materials of some soils require thousands of years to accumulate; for example, those of the rocky Lithosols on Horse or Little Peaked Mountains. On the other hand, the parent materials of other soils require only a few years to accumulate. Examples are soils on flood plains. These soils are never in position long enough for the normal soil processes of the area to influence horizon development. Such soils as the Podunk, Ondawa, and Limerick are essentially young soils and receive annual deposits of material where streams are most active. They lack some of the horizons of the old or mature soils of the upland and glacial terraces. Time is also a factor, and a very important one, in the formation of the soils from organic deposits.

Classification and Morphology of Soils

Soils are classified in lower categories—soil series, soil types, and soil phases. A soil series is a group of soils that formed on similar parent materials and have similar profile characteristics; they can differ in texture of the surface soil and in external features, such as slope and stoniness. To identify soils within a series that have the same textural class, the soil type is used. Within a soil type, there may be soils that vary widely in degree of slope, class of erosion, and other external features that significantly affect use and management. To identify soils within a soil type that have, for example, similar slope, the phase category is used.

Soil series are classified into higher categories called great soil groups. Each great soil group contains soils that have the same kind and number of definitive horizons in their profiles, although the horizons need not be of the same thickness nor expressed to the same degree.

The soils of the survey area are members of the Podzol, Brown Podzolic, Humic Gley, Low-Humic Gley, Bog, or Alluvial great soil groups.

The highest category in the present system of soil classification consists of three classes, known as the zonal, intrazonal, and azonal orders. The zonal order comprises soils with evident, genetically related horizons that reflect the dominant influence of climate and living organisms in their formation. The zonal soils in the county are in the Podzol and Brown Podzolic great soil groups. The intrazonal order comprises soils with evident, genetically related horizons that reflect the dominant influence of one or more local factors of parent material or topography, over the effects of climate and living organisms. The intrazonal soils in the county are in the Humic Gley, Low-Humic Gley, and Bog great soil groups. The azonal order comprises soils that lack distinct, genetically related horizons because of one or more of the following: Youth of parent materials, resistance of parent materials to change, or steep topography. The azonal soils in the county are members of the Alluvial great soil group.

In table 10, the soil series in the county are grouped according to parent materials and drainage. In addition, the great soil group is given for each series.

TABLE 10.—*Parent material, great soil group, and drainage of the soil*

Parent material and great soil group	Drainage						
	Excessive	Somewhat excessive	Good	Moderately good	Somewhat poor	Poor	Very poor
Glacial till from—							
Lime-seamed slate, shale, and phyllite materials; very firm to extremely firm, moderately low percentage of coarse fragments, at least 50 percent silt and 5 to 15 percent clay:							
Podzol		Thorndike					
Podzol			Bangor	Dixmont			
Low-Humic Gley						Monarda	
Humic Gley							Burnham.
Limestone, slate, and calcareous quartzite materials; extremely firm, moderately high percentage of coarse fragments, high percentage of silt and clay:							
Bisequal[1] Podzol			Perham		Daigle		
Mixed granite, quartzite, and slate or phyllite materials; extremely firm to firm, moderately high to high percentage of coarse fragments, moderately low percentage of silt and clay:							
Podzol		Thorndike Canaan					
Podzol			Plaisted	Howland			
Low-Humic Gley						Monarda	
Humic Gley							Burnham.
Largely granitic materials; loose to firm, very high percentage of coarse fragments, very low percentage of silt and clay:							
Podzol		Canaan					
Podzol			Hermon				
Glacial outwash from—							
Slate, shale, quartzite, and some sandstone and granite:							
Podzol	Colton (cobbly).	Colton (gravelly sandy loam).	Stetson	Machias (loamy). Machias (sandy).			
Deep sandy or fine sandy materials; little or no gravel:							
Podzol		Adams					
Silty and sandy materials with gravel streaks or scattered pebbles:							
Low-Humic Gley						Red Hook.	
Humic Gley							Atherton.
Alluvium on postglacial terraces—							
Water-assorted sands and gravel:							
Podzol			Allagash	Madawaska			
Fine-textured deposits in lakes, the sea, or temporary ponds (ice dams, beaver ponds, mill ponds)—							
Silt, clay, and fine sandy clay materials:							
Brown Podzolic			Suffield	Buxton			
Low-Humic Gley						Scantic	
Humic Gley							Biddeford.
Slate, shale, quartzite, and some sandstone and granite materials:							
Low-Humic Gley						Limerick	

[1] For definition, see Glossary.

TABLE 10.—*Parent material, great soil group, and drainage of the soil*—Continued

Parent material and great soil group	Drainage						
	Excessive	Somewhat excessive	Good	Moderately good	Somewhat poor	Poor	Very poor
Fine-textured deposits in lakes, the sea, or temporary ponds—Continued							
Thin to moderately deep (1 to 4 feet) fine sandy material over silt and clay:							
Brown Podzolic			Melrose	Elmwood			
Alluvium on flood plains—							
Slate, shale, quartzite, some sandstone and granite materials:							
Sandy materials:							
Alluvial			Hadley	Winooski			Saco.
Silty materials:							
Alluvial			Ondawa	Podunk			
Soils on organic materials from—							
Coniferous and deciduous woods, heath bushes, sphagnum moss, sedges, and rushes:							
Well-decomposed, black, organic materials:							
Bog							Muck.
Partly decomposed, brown, woody materials:							
Bog							Peat, coarsely fibrous.
Partly decomposed, brown, sphagnum materials:							
Bog							Peat, sphagnum.
Partly decomposed, brown sedges, and rush materials:							
Bog							Peat, modately fibrous.
Unclassified materials:							
Bog							Peat and muck.

Podzol soils

Differentiation of horizons in these soils seems directly related to the presence of a surface mat of plant residues. In Penobscot County the accumulation of such a mat is due in part to the cool, humid climate and in part to the resistant character of the plant residues. The cool climate tends to slow down processes of decay, as does the nature of the residues. Characteristically, the surface mat of organic matter is an inch or two thick in Podzols, but it may range from as little as one-quarter inch to as much as 6 inches. A surface organic mat of some thickness is present on the surface of every Podzol, except where it has been destroyed by fire, tillage, or some other means.

The surface mat of organic matter consists of twigs, conifer needles, deciduous leaves, and the like, held together by a network of fungal hyphae. The fungi are apparently important to the decomposition of the organic matter. The decomposition or decay of plant residues proceeds slowly and permits small accumulations of substances that are intermediate stages in the breakdown of lignin, cellulose, and similar components to the final products of water, carbon dioxide, and salts. The partial decomposition products thus formed are comparatively rich in carboxyl groups, as indicated by the high proportion of total carbon in carboxyl form in the B horizons of Podzols. Carboxyl groups in the surface organic mat could provide carboxylic acid radicals, which are then active in the differentiation of horizons.

As rain falls or snow melts, water penetrates the surface mat and dissolves small quantities of the substances formed by partial decay of the organic residues. The solutions thus formed percolate downward and act as acid solvents, which attack the mineral fraction of the soil beneath the surface mat. The acid radicals in these percolates seem to be especially effective in dissolving sesquioxides; that is, iron and aluminum oxides. The acid solvents also attack silicate minerals.

The solution of iron and aluminum is most pronounced in a layer immediately beneath the surface mat of organic matter. Effects of such solution are best expressed in the removal of coatings of ferric oxides from the surfaces of sand and silt grains. Such removal may be complete in a layer ranging from one-sixteenth inch to several

inches in thickness. The affected layer is white or light gray in color, is the layer of maximum eluviation in the profile, and is known as an A_2 horizon. In western Europe such a layer is often called a bleicherde (literally, bleached earth).

The dilute percolating organic solutions transport iron or aluminum, or both, in complex form in the negative radical. These are carried downward in soils, mainly for distances measurable in inches. A small part of the percolate may move down through the profile and disappear from the soil. Most of the organic matter, iron, and aluminum that is dissolved, however, is carried downward a foot or so and accumulates in the B_2 horizon, the layer of maximum illuviation. Because of the humus, iron oxides, or both, concentrated in it, the B_2 horizon is strong brown to yellowish red in color. The B_2 horizon of a Podzol may be very high in humus, iron, and aluminum, or in one or more of these, and each such horizon will have some accumulation of humus, though not necessarily iron or aluminum. In Europe the B_2 horizon of Podzols is also called an orterde (earth in place), if it is friable. This is the common kind of B_2 horizon in Podzols of Penobscot County. The B_2 horizon may be cemented and hard in Podzol profiles, as is true for occasional spots of Adams and Hermon soils. A cemented layer of this kind is known as an ortstein (stone formed in place). A profile of one of the extensive Podzols in the county, Hermon very stony sandy loam, is shown in figure 21.

All in all, the Podzols of Penobscot County do not have strongly expressed horizons and deep profiles. Combined thickness of the A and B horizons is generally less than 1½ feet, and in many soils no more than 1 foot. As a consequence, the A and B horizons in some cultivated areas have been mixed to the point where they are scarcely distinguishable. In other places, the Podzols have A and B horizons thick enough that part of the B horizon is below the reach of the plow. Remnants of the B horizon may therefore be found beneath the plow layer in some fields in various parts of the county.

Adams, Allagash, Bangor, Colton, Canaan, Daigle, Dixmont, Hermon, Howland, Machias, Madawaska, Perham, Plaisted, Stetson, and Thorndike are the Podzol soils in the county.

Brown Podzolic soils

Brown Podzolic soils are the result of the same processes that produce the Podzols. The processes, however, are weaker. Consequently, Brown Podzolic soils lack or have only thin, discontinuous A_2 horizons and have B_2 horizons that are lower in accumulated sesquioxides and humus than the B_2 horizons in Podzols.

Brown Podzolic soils in Penobscot County were derived from parent materials that have been in place since the latest glaciation and that occupy positions high enough in the landscape to be above any strong influence of the ground water table. The parent materials are of mixed mineralogy and are not extreme in their chemical composition or in their physical character. Consequently, the differentiation of horizons in the soil profiles strongly reflects the effects of climate and of living organisms, including both vegetation and small animals.

In wooded areas in the county, the Brown Podzolic soils have a mat of organic matter about 2 inches thick. This mat consists of partly decomposed leaves or needles. The surface mineral layer, or A_1 horizon, is 1 to 3 inches thick, dark grayish brown, and friable. Below this layer is a strong-brown, yellowish-brown, or olive-brown B_2 horizon that is also friable. Clay has not accumulated in this layer, which in most places has a weak, fine, granular structure.

Figure 21.—**Profile of Hermon very stony sandy loam showing well-developed Podzol profile. Note the thick A_2 and the pronounced B_{21} (orterde) horizon.**

The Brown Podzolic soils in Penobscot County (the Suffield, Buxton, Melrose, and Elmwood) become finer textured with depth. The solum of the Suffield and Buxton soils is silty, whereas that of the Melrose and Elmwood soils is sandy and overlies silt and clay. (See profile descriptions of these soils in the section "Descriptions of the Soils.") The Suffield and Buxton soils, however, do have subangular blocky structure in the lower B horizon, which resembles the B horizon of the Gray-Brown Podzolic soils. No Gray-Brown Podzolic soils occur in Penobscot County.

Humic Gley soils

Humic Gley soils have a thick, very dark A horizon over a gray or mottled B horizon. They are poorly drained or very poorly drained soils that have formed under vegetation that is typical of very wet land.

In wooded areas, the Humic Gley soils in the county have a humus-enriched surface horizon that is 7 inches

TABLE 11.—*Percentage of silt, clay, and sand*[1] *in selected soil samples*[2]

Soil	A Horizon (surface soil)				B Horizon (subsoil)				C Horizon (substratum)			
	Silt	Clay	Sand	Textural class	Silt	Clay	Sand	Textural class	Silt	Clay	Sand	Textural class
	Percent	*Percent*	*Percent*		*Percent*	*Percent*	*Percent*		*Percent*	*Percent*	*Percent*	
Allagash fine sandy loam	31. 0	7. 5	61. 5	Fine sandy loam.	28. 6	6. 6	64. 8	Fine sandy loam.	18. 9	5. 0	76. 1	Loamy sand.
Bangor silt loam	61. 5	13. 5	25. 0	Silt loam	56. 0	10. 0	34. 0	Silt loam	56. 0	13. 0	31. 0	Silt loam.
Bangor silt loam	54. 8	12. 0	33. 2	Silt loam	51. 0	9. 0	40. 0	Silt loam	60. 0	11. 0	29. 0	Silt loam.
Buxton silt loam	65. 5	14. 0	20. 5	Silt loam	57. 0	22. 0	21. 0	Silt loam	58. 7	36. 5	4. 8	Silty clay loam.
Colton loamy fine sand, dark material.	12. 0	6. 5	81. 5	Loamy fine sand.	10. 5	1. 5	88. 0	Sand	5. 0	0	95. 0	Sand.
Dixmont silt loam	57. 3	17. 5	25. 2	Silt loam	51. 0	17. 0	32. 0	Silt loam	52. 5	13. 0	34. 5	Silt loam.
Elmwood fine sandy loam	68. 5	11. 5	20. 0	Silt loam	51. 5	9. 0	39. 5	Fine sandy loam.	68. 0	27. 5	4. 5	Silty clay loam.
Monarda silt loam	55. 5	21. 0	23. 5	Silt loam	57. 2	13. 0	29. 8	Silt loam	55. 5	13. 5	31. 0	Silt loam.
Plaisted loam	43. 4	6. 2	50. 4	Loam	35. 0	5. 0	60. 0	Fine sandy loam.	38. 0	6. 0	56. 0	Fine sandy loam.
Plaisted loam	41. 0	12. 0	47. 0	Loam	41. 0	4. 0	55. 0	Fine sandy loam.	43. 0	5. 0	52. 0	Fine sandy loam.
Suffield silt loam	73. 0	20. 0	7. 0	Silt loam	72. 0	21. 0	7. 0	Silt loam	70. 0	22. 0	8. 0	Silt loam.
Suffield silt loam	68. 0	6. 0	26. 0	Silt loam	64. 0	7. 0	29. 0	Silt loam	54. 5	6. 0	39. 5	Silt loam.
Thorndike silt loam	57. 0	16. 5	26. 5	Silt loam	54. 0	12. 0	34. 0	Silt loam	50. 0	8. 0	42. 0	Silt loam.

[1] Mechanical analysis by hydrometer method.
[2] Analyses by ELIOT EPSTEIN and W. J. GRANT, Agricultural Research Service, U.S. Department of Agriculture, and Maine Agricultural Experiment Station, Orono, Maine.

thick, or more. The Atherton, Biddeford, and Burnham soils are members of this great soil group.

Low-Humic Gley soils

Low-Humic Gley soils usually have a thinner A_1 horizon and have slightly better drainage than the Humic Gley soils, but deeper in the profile they are similar.

In wooded areas, the Low-Humic Gley soils in the county have a humus-enriched surface layer that is only a couple of inches thick. The Limerick, Monarda, Red Hook, and Scantic soils are members of this great soil group.

Bog soils

Bog soils consist of brown, dark-brown, or black peat or muck. These organic soils are made up of partly decomposed remains of sedges, rushes, and trees. Because these plant remains have been saturated with water most of the time, they have been preserved. Muck is more highly decomposed than peat. Some of the Bog soils are alkaline, but most are acid. These soils are generally waterlogged the entire year.

The Bog soils in the county are Muck; Peat, coarsely fibrous; Peat, sphagnum; Peat, moderately fibrous; and Peat and muck.

Alluvial soils

Alluvial soils occur on flood plains only a few feet above rivers and streams. They are forming in sediments transported and redeposited by overflow from present streams. The soils have not been in place long enough to develop eluvial and illuvial horizons. They

TABLE 12.—*Percentage of organic matter in selected soil samples*[1]

Depth	Allagash fine sandy loam	Bangor silt loam	Bangor silt loam	Buxton silt loam	Colton loamy fine sand, dark materials	Dixmont silt loam	Elmwood fine sandy loam	Monarda silt loam	Plaisted loam	Plaisted loam	Suffield silt loam	Suffield silt loam	Thorndike silt loam
	Percent	*Percent*	*Percent*	*Percent*	*Percent*	*Percent*	*Percent*	*Percent*	*Percent*	*Percent*	*Percent*	*Percent*	*Percent*
Surface soil (about 8 inches thick)	3. 11	3. 87	5. 31	3. 66	2. 42	3. 73	4. 35	7. 18	6. 70	7. 39	6. 21	5. 31	6. 77
Subsoil (about 14 inches thick)	1. 49	2. 97	2. 00	. 82	. 69	. 83	1. 14	1. 17	1. 24	4. 49	2. 21	3. 39	5. 18
	. 97	1. 38	. 41	. 21	. 35	. 48	. 35	----	. 62	1. 80	. 97	1. 31	2. 83
Substratum (usually below 20 inches from surface)	. 33	. 14	. 18	. 14	0	. 28	. 45	. 48	. 52	1. 31	. 62	. 48	2. 69
	. 16	. 29	. 07	. 12	0	0	------	---	. 48	--------	------	------	------

[1] Analyses by ELIOT EPSTEIN and W. J. GRANT, Agricultural Research Service, U.S. Department of Agriculture, and Maine Agricultural Experiment Station, Orono, Maine.

do, however, show an accumulation of organic matter in the surface horizons. These immature soils have only A and C horizons.

The Alluvial soils in Penobscot County occur mainly on the flood plains. They also occur in scattered areas near the lakes and streams as small patches of sand dunes and steep drifts. These dunes and drifts are essentially no more than parent materials of the soils, or regoliths.

The Alluvial soils in the county are the Hadley, Ondawa, Podunk, Saco, and Winooski.

Analytical Data

Analytical data for selected soils are given in this section.

In table 11 (on p. 105) are shown the relative proportions of silt, clay, and sand in the A, B, and C horizons (surface soil, subsoil, and substratum) of the selected soils.

Table 12 (on page 105) shows the percentage of organic matter in selected soils in the county. The moderately shallow Thorndike has the highest percentage of organic

TABLE 13.—*Chemical and moisture*

Soil	Horizon	Depth	Reaction	Organic carbon	Nitrogen	C/N ratio	Free iron oxides (Fe_2O_3)
		Inches	*pH*	*Percent*	*Percent*		*Percent*
Bangor loam, profile 1	A_p	0–7	5.1	4.85	0.334	14	2.6
	B_{21}	7–10½	5.8	1.98	.150	13	2.8
	B_{22}	10½–14	6.0	.67	.072	9	2.6
	B_3	14–20	6.0	.26	.042	6	2.2
	C_1	20–27	6.0	.14	.031	5	2.0
	C_2	27–40	5.8	.06	.028	2	1.9
	C_3	40–50	5.8	.09	.034	3	2.2
Bangor silt loam, profile 2	A_{p1}	0–4	5.0	4.69	.341	14	2.4
	A_{p2}	4–8	4.9	2.60	.218	12	2.4
	B_{21}	8–14	5.2	1.70	.138	12	2.4
	B_{22}	14–21	5.2	.94	.096	10	2.0
	C_1	21–32	5.3	.10	.037	3	1.8
	C_2	32–40	5.2	.13	.036	4	1.9
Bangor very stony silt loam, profile 3	A_2	1–3	3.9	1.79	.121	15	.7
	B_{21}	3–9	4.3	4.50	.252	18	4.4
	B_{22}	9–19	4.8	1.24	.085	14	1.8
	C_1	19–32	5.1	.25	.034	7	1.4
	C_2	32–40+	5.3	.16	.029	6	1.6
Burnham very stony loam, profile 1	A_{2g}	1–7	4.7	[1] 1.47	----	----	.2
	C_{1g}	7–17	6.4	.03	----	----	.7
	C_{2g}	17–36	5.7	.08	----	----	.7
Burnham very stony loam, profile 2	A_1	0–8	5.0	6.70	----	----	.6
	A_{2g}	8–18	5.3	.24	----	----	.4
	C_{1g}	18–30	5.5	.36	----	----	.3
	C_{2g}	30–34	5.5	.35	----	----	.3
Dixmont silt loam, profile 1	A_p	0–7	5.8	3.50	.241	14.5	2.3
	B_{21}	7–10	6.2	1.24	.098	12.6	2.3
	B_{22gm}	10–15	6.3	.37	.043	8	2.0
	B_{31gm}	15–23	6.4	.21	.037	6	1.9
	B_{32gm}	23–32	6.5	.18	.032	6	2.0
	B_{33gm}	32–38	6.4	.14	----	----	1.8
	C_1	38–44	6.6	.12	----	----	1.9
Dixmont loam, profile 2	A_p	0–9	6.0	2.67	.213	12.5	2.4
	B_{21}	9–13	6.1	.41	.047	9	1.9
	B_{31gm}	13–23	6.1	.11	.030	4	2.0
	B_{32gm}	23–33	6.3	.08	.021	4	1.9
	B_{33gm}	33–44	6.4	.10	----	----	2.2
	C_1	44–52	6.4	.08	----	----	2.2
Dixmont silt loam, profile 3	A_p	0–7	5.7	2.66	.215	12.4	2.4
	B_2	7–11	5.6	1.70	.126	13.5	2.5
	B_{31gm}	11–15	5.8	.16	.034	5	2.9
	B_{32gm}	15–25	5.8	.16	.052	3	2.4
	B_{33gm}	25–36	5.9	.05	----	----	2.6
	B_{34gm}	36–46	6.0	.04	----	----	2.6
	C_1	46–60+	6.0	.04	----	----	2.3

See footnote at end of table.

matter throughout the profile. The Plaisted, Monarda, and Suffield soils have highest percentages of organic matter in the surface soil (6.21 to 7.39 percent). The Colton soil has the lowest percentage (2.42). The organic matter in the relatively productive soils (Allagash, Bangor, Dixmont, and Elmwood) ranges between 3.11 and 5.31 percent. The percentage in all except the Bangor, Plaisted, Suffield, and Thorndike drops to less than 1 percent in the lower subsoil. None of the soils except the Plaisted and Thorndike have more than 1 percent of organic matter in the substratum. The fragipan of the Plaisted soils frequently acts like bedrock, and lateral movement of the organic solution is probably similar to that in the moderately shallow Thorndike. In both the Plaisted and Thorndike soils, the organic matter has been held in the substratum and has not moved into deeper material.

Samples from profiles of soils of representative series were analyzed by the Soil Survey Laboratory, Beltsville, Md. Results are reported in tables 13 and 14.

data for representative soils

Bulk density	Moisture held at—			Cation exchange capacity		Extractable cations (meq. per 100 grams of soil)					Base saturation by sum of cations
	1/10 atmosphere	1/3 atmosphere	15 atmospheres	Capacity by NH_4Ac	Capacity by sum of cations	Ca	Mg	H	Na	K	
g./cc	Percent	Percent	Percent	Meq./100 g. soil	Meq./100 g. soil						Percent
----------	----------	31.6	11.6	----------	27.7	7.5	0.3	19.4	0.1	0.4	30
----------	----------	24.6	7.9	----------	16.8	4.7	.5	11.4	<.1	.2	32
----------	----------	19.6	5.1	----------	8.7	1.8	.1	6.6	<.1	.2	24
----------	----------	22.0	4.0	----------	5.4	1.1	.2	3.9	<.1	.2	28
----------	----------	19.9	4.5	----------	5.4	1.4	.2	3.5	<.1	.3	35
----------	----------	22.4	4.5	----------	5.6	1.3	.1	3.7	.1	.4	34
----------	----------	22.5	6.4	----------	7.3	1.7	.4	4.5	.1	.6	38
----------	----------	33.8	9.8	----------	24.2	3.3	.7	19.5	.1	.6	19
----------	----------	31.6	7.3	----------	18.9	1.9	.4	16.1	.1	.4	15
----------	----------	32.6	7.5	----------	17.3	1.1	.4	15.5	.1	.2	10
----------	----------	32.7	5.8	----------	12.3	.5	.2	11.3	.1	.2	8
----------	----------	20.7	4.8	----------	6.1	1.3	.2	4.3	<.1	.3	30
----------	----------	21.4	5.5	----------	6.5	1.2	.4	4.5	.1	.3	31
----------	----------	25.5	4.9	----------	17.3	1.4	.3	15.4	.1	.1	11
----------	----------	29.7	12.9	----------	42.3	.6	.2	41.2	.1	.2	3
----------	----------	22.6	5.0	----------	14.0	.2	.1	13.5	.1	.1	4
----------	----------	19.8	3.2	----------	5.9	.2	<.1	5.5	.1	.1	7
----------	----------	19.5	4.3	----------	5.3	.6	<.1	4.5	.1	.1	15
----------	----------	----------	----------	----------	13.6	.1	.2	13.1	.1	.1	4
----------	----------	----------	----------	----------	4.8	2.2	1.2	1.2	.1	.1	75
----------	----------	----------	----------	----------	4.0	1.3	.8	1.7	.1	.1	58
----------	----------	----------	----------	----------	20.5	10.8	1.7	7.8	.1	.1	62
----------	----------	----------	----------	----------	2.9	.8	.3	1.8	<.1	<.1	38
----------	----------	----------	----------	----------	4.4	.5	.1	3.8	<.1	<.1	14
----------	----------	----------	----------	----------	5.0	.5	.2	4.3	<.1	<.1	14
1.19	43.1	30.6	8.6	14.2	21.1	7.6	.4	12.9	.1	.1	39
1.37	32.2	25.3	5.7	7.8	12.3	3.6	.4	8.0	.1	.2	35
1.70	23.5	21.0	4.2	5.0	7.0	3.0	.3	3.6	<.1	.1	48
1.71	24.2	21.8	6.8	6.6	8.6	4.4	.4	3.6	<.1	.2	58
1.72	25.0	23.2	7.4	6.8	9.6	4.4	.8	4.1	.1	.2	57
1.72	24.2	22.0	6.5	5.8	8.4	4.2	.6	3.4	.1	.1	60
----------	22.8	21.6	6.0	5.6	8.1	3.8	.7	3.4	.1	.1	58
1.41	36.3	27.3	7.4	11.6	15.0	4.9	.8	9.0	.1	.2	40
1.68	24.1	17.2	4.1	4.0	5.2	1.2	.2	3.6	.1	.1	31
1.80	24.0	19.0	4.4	4.5	6.1	2.7	.4	2.9	<.1	.1	52
1.77	25.1	21.0	3.7	4.7	6.4	3.2	.5	2.6	<.1	.1	59
1.79	27.1	21.5	4.8	4.7	7.1	3.0	.6	3.4	<.1	.1	52
2.02	27.1	21.2	5.5	5.1	7.5	3.7	.6	3.1	<.1	.1	59
1.32	36.5	31.2	8.1	11.8	18.1	5.7	.8	11.4	.1	.1	37
1.36	39.9	31.6	7.2	6.0	15.5	2.9	.4	11.9	.1	.2	23
1.52	24.3	22.1	6.5	4.1	7.2	1.4	.4	5.1	.1	.2	29
1.90	26.0	22.1	6.4	6.0	9.3	1.0	.2	7.8	.1	.2	16
1.84	22.0	18.8	3.9	3.4	4.7	1.4	.2	2.9	.1	.1	38
1.89	20.9	17.7	3.0	3.4	3.1	1.4	.3	1.2	.1	.1	61
1.96	20.8	18.5	2.5	2.7	2.6	1.2	.2	1.0	.1	.1	62

TABLE 13.—*Chemical and moisture*

Soil	Horizon	Depth	Reaction	Organic carbon	Nitrogen	C/N ratio	Free iron oxides (Fe_2O_3)
		Inches	*pH*	*Percent*	*Percent*		*Percent*
Dixmont silt loam, profile 4	A_p	0–7	5.7	3.44	0.240	14.3	2.3
	B_{2p}	7–9	5.9	1.38	.118	11.7	2.4
	B_{31gm}	9–15	6.0	.40	.085	5	2.0
	B_{32gm}	15–23	6.2	.17	.025	7	2.3
	B_{33gm}	23–37	6.4	.12	.022	5	2.2
	B_{34gm}	37–50	8.1	.06	----------	----------	1.7
	C_1	50–56	8.2	.06	----------	----------	1.9
Monarda silt loam, profile 1	A_p	0–8	5.4	2.37	.215	11	1.3
	A_{2g}	8–11	6.0	.25	.040	6	1.5
	B_{31gm}	11–18	5.8	.13	.030	4	2.0
	B_{32gm}	18–23	6.1	.11	.025	4	2.0
	B_{33gm}	23–35	6.1	.09	.024	4	2.3
	B_{34gm}	35–44	6.1	.11	----------	----------	2.1
	C_g	44–52+	6.2	.10	----------	----------	2.0
Monarda silt loam, profile 2	A_p	0–7	6.5	2.96	.221	13.3	2.2
	A_{2g}	7–10	6.9	.67	.067	10	2.2
	B_{31gm}	10–15	7.1	.41	.050	8	2.1
	B_{32gm}	15–26	7.3	.13	.029	4	2.2
	B_{33gm}	26–38	7.6	.11	----------	----------	2.0
	B_{34gm}	38–50	7.7	.10	----------	----------	2.0
	C_{1g}	50–62+	7.9	.08	----------	----------	1.9
Plaisted very stony loam, profile 1	A_p	0–5	5.5	4.11	.266	15	1.8
	A_{2p}	5–6	4.7	.88	.066	13	1.0
	B_{21}	6–11	5.0	1.61	.105	15	3.1
	B_{22}	11–15	5.5	.32	.036	9	.9
	C_1	15–19	5.4	.18	.023	8	.6
	C_2	19–32+	5.6	.07	.013	5	.5
Plaisted extremely stony loam, profile 2	A_2	0–4	3.5	2.18	.073	30	.3
	B_{21}	4–8	4.0	2.37	.138	17	4.5
	B_{22}	8–12	4.8	1.90	.093	20	2.0
	C_1	12–26	4.9	.63	.045	14	.9
	C_2	26–35	5.2	.18	.018	10	.6
Plaisted loam, profile 3	A_p	0–5	5.3	2.94	.204	14	1.8
	B_{21}	5–6	5.3	2.18	.150	14	2.1
	B_{22}	6–13	5.5	.91	.067	14	1.1
	C_1	13–18	5.7	.24	.021	11	.6
	C_2	18–36	5.6	.12	.013	9	.6
	C_3	36–58+	5.6	.06	.008	8	.6

[1] Mean of three determinations.

data for representative soils—Continued

Bulk density	Moisture held at—			Cation exchange capacity		Extractable cations (meq. per 100 grams of soil)					Base saturation by sum of cations
	1/10 atmosphere	1/3 atmosphere	15 atmospheres	Capacity by NH_4Ac	Capacity by sum of cations	Ca	Mg	H	Na	K	
g./cc	*Percent*	*Percent*	*Percent*	*meq./100g. soil*	*meq./100g. soil*						*Percent*
1.26	45.5	33.1	8.9	12.6	16.5	4.1	0.4	11.7	0.1	0.2	29
1.67	37.3	32.5	7.8	9.2	12.4	2.2	.4	9.5	.1	.2	23
1.61	24.8	23.6	5.9	5.1	6.7	1.3	.3	4.8	.1	.2	28
1.88	23.5	22.2	6.1	4.6	7.4	2.7	.3	4.3	<.1	.1	42
1.89	23.6	21.8	4.8	4.6	6.7	3.2	.3	3.1	<.1	.1	54
1.86	26.7	23.2	3.8	4.8	18.0	17.5	.4	<.1	<.1	.1	100
1.90	24.0	22.6	4.1	3.3	20.6	20.0	.5	<.1	<.1	.1	100
1.33	43.2	28.7	7.1	11.2	14.3	3.8	.5	9.7	.1	.2	32
1.76	24.1	18.0	3.6	3.7	5.3	1.7	.3	3.1	.1	.1	42
1.81	22.4	17.4	4.6	4.8	6.8	2.9	.3	3.4	.1	.1	50
1.84	23.2	18.8	5.1	5.2	6.9	2.6	.5	3.6	.1	.1	48
1.79	24.5	19.5	4.8	4.6	7.3	3.2	.5	3.4	.1	.1	53
1.71	24.2	19.9	4.8	4.3	6.4	2.5	.4	3.4	<.1	.1	47
1.80	22.5	18.0	3.2	3.7	4.8	2.3	.2	2.2	<.1	.1	54
1.36	44.3	32.8	8.9	14.6	20.4	11.7	1.0	7.5	.1	.1	63
1.62	31.0	23.7	6.0	7.0	10.4	6.0	.6	3.6	.1	.1	65
1.68	28.0	22.4	6.2	6.6	9.2	5.7	.5	2.9	<.1	.1	68
1.88	25.0	19.3	6.0	5.0	6.8	4.2	.6	1.9	<.1	.1	72
1.91	23.9	21.1	5.2	4.7	6.5	4.6	.6	1.2	<.1	.1	82
1.82	23.6	20.9	5.0	4.4	5.5	3.8	.6	1.0	<.1	.1	82
----------	23.1	21.0	5.2	4.2	6.5	4.6	.5	1.2	<.1	.2	82
----------	----------	29.2	9.1	----------	23.8	7.0	.1	16.0	.1	.6	33
----------	----------	23.9	3.6	----------	11.6	2.0	<.1	9.5	<.1	.1	18
----------	----------	25.7	10.7	----------	24.5	1.0	.4	22.7	<.1	.4	7
----------	----------	14.3	3.5	----------	8.1	.6	.1	7.1	<.1	.3	12
----------	----------	17.4	2.5	----------	4.8	.4	.1	3.9	.1	.3	19
----------	----------	16.1	1.5	----------	3.1	.2	<.1	2.7	.1	.1	13
----------	33.1	----------	4.7	----------	12.5	.9	.3	11.0	.1	.2	12
----------	34.0	----------	13.2	----------	38.6	.2	.7	37.5	.1	.1	3
----------	24.3	----------	9.2	----------	19.7	.1	.3	19.0	.1	.2	4
----------	21.5	----------	4.9	----------	8.2	<.1	<.1	7.9	.1	.2	4
----------	14.8	----------	2.1	----------	4.0	<.1	.1	3.7	.1	.1	8
----------	39.9	----------	7.4	----------	20.6	2.5	.3	17.2	.1	.5	16
----------	31.4	----------	8.5	----------	24.0	1.2	.1	22.4	.1	.2	7
----------	19.8	----------	4.8	----------	12.5	.6	.1	11.5	.1	.2	8
----------	15.2	----------	2.0	----------	4.1	.2	<.1	3.7	.1	.1	10
----------	18.7	----------	1.5	----------	2.5	<.1	.1	2.2	.1	.1	12
----------	17.1	----------	1.0	----------	1.2	<.1	<.1	1.0	.1	.1	17

TABLE 14.—*Mechanical analysis of representative soils*

Soil	Horizon	Depth	Particle size distribution: Very coarse sand (2–1 mm.)	Coarse sand (1–0.5 mm.)	Medium sand (0.5–0.25 mm.)	Fine sand (0.25–0.10 mm.)	Very fine sand (0.10–0.05 mm.)	Silt (0.05–0.002 mm.)	Clay (less than 0.002 mm.)	Other size classes: 0.2–0.02 mm.	0.02–0.002 mm.	Greater than 2 mm.
		Inches	*Percent*	*Percent*	*Percent*	*Percent*	*Percent*	*Percent*	*Percent*	*Percent*	*Percent*	*Percent*
Bangor loam, profile 1	A_p	0–7	11. 4	13. 7	6. 0	6. 2	7. 7	46. 2	8. 8	30. 8	26. 5	12
	B_{21}	7–10½	13. 3	17. 4	6. 5	5. 5	8. 1	43. 3	5. 9	32. 2	22. 1	53
	B_{22}	10½–14	15. 4	20. 3	10. 0	6. 9	7. 7	36. 2	3. 5	28. 7	18. 4	38
	B_3	14–20	8. 6	12. 0	7. 7	8. 7	9. 6	46. 5	6. 9	32. 3	28. 6	14
	C_1	20–27	5. 8	7. 6	5. 4	8. 6	10. 7	51. 7	10. 2	33. 3	33. 9	11
	C_2	27–40	3. 6	4. 5	3. 6	6. 0	9. 2	63. 5	9. 6	32. 8	43. 6	12
	C_3	40–50	5. 2	5. 1	3. 2	6. 5	8. 8	56. 4	14. 8	29. 6	39. 6	12
Bangor silt loam, profile 2	A_{p1}	0–4	5. 6	6. 7	3. 7	6. 2	7. 5	59. 5	10. 8	31. 8	38. 9	33
	A_{p2}	4–8	6. 9	6. 5	3. 6	6. 2	8. 9	58. 9	9. 0	32. 1	39. 4	39
	B_{21}	8–14	4. 4	6. 7	3. 8	7. 1	10. 9	59. 6	7. 5	37. 2	32. 6	32
	B_{22}	14–21	6. 4	6. 8	3. 9	6. 9	9. 4	58. 7	7. 9	33. 6	38. 6	38
	C_1	21–32	6. 7	6. 6	3. 4	6. 0	7. 6	55. 4	14. 3	25. 8	40. 7	39
	C_2	32–40	5. 8	6. 4	3. 2	5. 8	7. 6	55. 9	15. 3	26. 1	40. 9	35
Bangor very stony silt loam, profile 3.	A_2	1–3	3. 8	4. 6	3. 6	9. 4	12. 5	61. 5	4. 6	42. 1	36. 2	9
	B_{21}	3–9	6. 5	7. 0	4. 2	5. 1	16. 7	55. 7	4. 8	41. 8	31. 8	21
	B_{22}	9–19	7. 2	7. 5	4. 8	6. 1	16. 4	54. 3	3. 7	41. 0	31. 9	28
	C_1	19–32	5. 1	7. 0	4. 6	10. 3	14. 0	53. 2	5. 8	40. 5	33. 0	23
	C_2	32–40+	6. 6	6. 2	4. 2	4. 7	17. 6	52. 6	8. 1	38. 5	32. 8	25
Burnham very stony loam, profile 1.	A_{2g}	1–7	5. 3	6. 9	5. 9	12. 6	15. 5	44. 9	8. 9	44. 4	23. 4	27
	C_{1g}	7–17	7. 8	9. 4	6. 7	13. 2	14. 9	41. 5	6. 5	41. 5	22. 8	24
	C_{2g}	17–36	4. 4	7. 2	6. 6	14. 0	16. 0	43. 8	8. 0	45. 3	22. 8	18
Burnham very stony loam, profile 2.	A_1	0–8	2. 8	9. 3	9. 4	19. 3	16. 1	38. 1	5. 0	47. 1	18. 2	20
	A_{2g}	8–18	7. 7	9. 6	8. 9	18. 0	21. 2	31. 4	3. 2	51. 5	11. 1	27
	C_{1g}	18–30	6. 7	9. 3	8. 8	18. 4	21. 1	33. 7	2. 0	52. 8	12. 8	23
	C_{2g}	30–34	6. 1	8. 7	8. 3	18. 6	22. 8	33. 8	1. 7	55. 3	12. 3	25
Dixmont silt loam, profile 1	A_p	0–7	10. 5	7. 7	3. 6	6. 1	8. 9	53. 6	9. 6	37. 2	28. 7	14. 6
	B_{21}	7–10	12. 9	10. 1	4. 6	7. 4	9. 7	48. 2	7. 1	36. 6	25. 3	19. 7
	B_{22gm}	10–15	8. 4	8. 3	4. 0	6. 6	8. 8	52. 4	11. 5	32. 2	32. 7	16. 2
	B_{31gm}	15–23	3. 7	3. 9	2. 2	5. 7	7. 6	58. 5	18. 4	29. 4	40. 0	12. 1
	B_{32gm}	23–32	2. 6	3. 0	2. 1	5. 4	8. 0	61. 1	17. 8	30. 4	41. 9	14. 1
	B_{33gm}	32–38	3. 5	3. 9	2. 7	7. 3	8. 3	58. 9	15. 4	31. 2	40. 3	16. 8
	C_1	38–44	5. 3	5. 0	3. 1	7. 5	8. 3	56. 5	14. 3	30. 7	38. 3	18. 8
Dixmont loam, profile 2	A_p	0–9	11. 7	9. 2	5. 2	7. 7	6. 8	48. 9	10. 5	29. 8	31. 8	24. 7
	B_{21}	9–13	11. 4	9. 0	5. 5	9. 6	8. 9	47. 1	8. 5	34. 4	26. 7	20. 1
	B_{31gm}	13–23	7. 1	6. 2	4. 0	8. 4	9. 6	53. 8	10. 9	33. 6	34. 5	14. 8
	B_{32gm}	23–33	6. 2	4. 8	2. 9	7. 5	8. 5	62. 0	8. 1	32. 6	42. 3	18. 3
	B_{33gm}	33–44	5. 4	4. 5	2. 9	7. 1	8. 9	59. 7	11. 5	32. 5	40. 2	17. 1
	C_1	44–52	7. 0	4. 5	2. 8	6. 6	8. 3	58. 0	12. 8	29. 2	41. 0	16. 4
Dixmont silt loam, profile 3	A_p	0–7	7. 4	4. 8	2. 5	5. 7	7. 5	58. 2	13. 9	31. 1	37. 9	24. 4
	B_2	7–11	9. 4	5. 0	2. 8	6. 2	7. 4	55. 3	13. 9	29. 7	36. 7	23. 0
	B_{31gm}	11–15	7. 6	6. 2	3. 6	8. 1	8. 9	50. 5	15. 1	31. 2	32. 9	25. 1
	B_{32gm}	15–25	6. 7	6. 4	3. 7	9. 1	10. 3	52. 0	11. 8	35. 0	32. 5	20. 8
	B_{33gm}	25–36	14. 6	8. 7	4. 8	10. 7	11. 4	42. 1	7. 7	35. 7	23. 9	29. 4
	B_{34gm}	36–46	9. 6	9. 2	6. 4	14. 2	15. 7	40. 1	4. 8	43. 8	19. 8	29. 7
	C_1	46–60+	11. 2	9. 3	5. 7	13. 4	15. 5	40. 9	4. 0	43. 7	20. 6	29. 0
Dixmont silt loam, profile 4	A_p	0–7	6. 6	4. 5	2. 6	5. 9	8. 0	57. 1	15. 3	34. 3	34. 3	16. 7
	B_{2p}	7–9	7. 3	5. 3	3. 1	6. 5	8. 4	53. 9	15. 5	32. 7	33. 3	18. 6
	B_{31gm}	9–15	7. 9	6. 0	3. 3	7. 7	9. 6	52. 1	13. 4	34. 8	31. 6	18. 1
	B_{32gm}	15–23	8. 6	5. 5	3. 2	7. 7	10. 0	50. 3	14. 7	32. 2	32. 6	15. 5
	B_{33gm}	23–37	7. 3	5. 8	3. 5	8. 6	11. 5	51. 8	11. 5	36. 8	31. 5	19. 9
	B_{34gm}	37–50	4. 5	4. 5	2. 8	7. 7	14. 1	58. 0	8. 4	42. 8	34. 1	20. 7
	C_1	50–56	11. 0	6. 4	3. 4	7. 0	8. 3	53. 2	10. 7	31. 2	34. 3	26. 5
Monarda silt loam, profile 1	A_p	0–8	6. 3	4. 5	3. 3	8. 9	8. 6	56. 1	12. 3	34. 5	35. 0	13. 6
	A_{2g}	8–11	5. 0	5. 0	4. 2	11. 5	10. 1	55. 8	8. 4	39. 0	32. 7	15. 3
	B_{31gm}	11–18	6. 7	5. 5	4. 4	12. 5	10. 2	49. 9	10. 8	36. 1	30. 6	13. 9
	B_{32gm}	18–23	6. 0	5. 2	3. 3	8. 1	9. 2	55. 4	12. 8	32. 4	36. 8	16. 6
	B_{33gm}	23–35	10. 1	6. 1	3. 4	7. 5	8. 5	53. 4	11. 0	30. 5	35. 6	14. 0
	B_{34gm}	35–44	4. 4	5. 6	3. 7	8. 6	9. 2	57. 5	11. 0	34. 0	37. 7	17. 9
	C_g	44–52+	6. 8	6. 5	4. 0	9. 9	11. 6	53. 8	7. 4	39. 2	32. 0	19. 3

TABLE 14.—*Mechanical analysis of representative soils*—Continued

Soil	Horizon	Depth	Particle size distribution: Very coarse sand (2–1 mm.)	Coarse sand (1–0.5 mm.)	Medium sand (0.5–0.25 mm.)	Fine sand (0.25–0.10 mm.)	Very fine sand (0.10–0.05 mm.)	Silt (0.05–0.002 mm.)	Clay (less than 0.002 mm.)	Other size classes: 0.2–0.02 mm.	0.02–0.002 mm.	Greater than 2 mm.
		Inches	*Percent*	*Percent*	*Percent*	*Percent*	*Percent*	*Percent*	*Percent*	*Percent*	*Percent*	*Percent*
Monarda silt loam, profile 2	A_p	0–7	6.9	4.6	2.8	7.5	9.5	51.0	17.7	33.0	31.9	13.7
	A_{2g}	7–10	4.3	3.8	2.4	8.1	10.6	55.1	15.7	36.3	34.3	9.4
	B_{31gm}	10–15	4.9	4.2	2.6	7.8	9.7	54.8	16.0	33.8	35.3	17.7
	B_{32gm}	15–26	7.8	4.6	2.8	7.4	10.4	52.0	15.0	33.2	33.6	18.8
	B_{33gm}	26–38	5.6	4.6	2.8	7.4	11.1	54.2	14.3	35.4	34.4	24.9
	B_{34gm}	38–50	8.5	5.0	2.9	7.3	10.8	51.8	13.7	34.7	32.3	16.6
	C_1	50–62+	5.6	5.1	3.0	7.9	11.7	53.5	13.2	36.4	33.6	21.5
Plaisted very stony loam, profile 1.	A_p	0–5	8.6	15.6	7.2	8.5	11.7	42.2	6.2	34.8	24.1	49
	A_{2p}	5–6	8.9	16.2	6.6	6.9	10.9	45.4	5.1	35.5	24.7	22
	B_{21}	6–11	16.1	27.3	9.4	6.7	6.2	27.7	6.6	22.2	15.1	50
	B_{22}	11–15	8.6	16.3	9.0	13.7	15.0	35.1	2.3	39.8	18.3	30
	C_1	15–19	3.8	6.6	6.1	13.5	18.3	50.3	1.4	48.6	28.2	18
	C_2	19–32+	3.8	6.2	5.7	13.0	17.1	51.8	2.4	47.5	29.5	28
Plaisted extremely stony loam, profile 2.	A_2	0–4	9.8	14.7	9.2	6.6	3.4	53.0	3.3	33.9	25.0	16
	B_{21}	4–8	7.4	14.0	13.0	15.2	11.8	25.5	13.1	21.1	23.8	46
	B_{22}	8–12	10.5	21.5	19.4	13.3	5.4	23.7	6.2	20.0	14.3	56
	C_1	12–26	12.6	14.7	9.8	14.5	9.6	27.1	11.7	24.3	19.9	50
	C_2	26–35	18.3	17.0	9.2	15.3	12.0	25.5	2.7	31.5	14.0	51
Plaisted loam, profile 3	A_p	0–5	7.6	11.1	8.6	16.2	16.7	34.6	5.2	42.8	17.3	18
	B_{21}	5–6	10.4	13.0	9.5	18.2	17.4	27.2	4.3	42.3	12.6	34
	B_{22}	6–13	12.2	15.3	11.3	17.7	21.2	20.0	2.3	41.6	8.1	27
	C_1	13–18	11.5	14.0	11.1	20.4	23.9	18.5	.6	45.4	9.2	35
	C_2	18–36	10.9	12.6	9.3	15.1	22.8	28.9	.4	48.9	10.3	33
	C_3	36–58+	10.8	12.6	8.9	14.5	21.6	31.3	.3	49.5	11.4	30

General Information About the County

In this section information is provided for those who wish to get a general idea of the county. Briefly discussed are organization and population of the county, the industries other than agriculture, the transportation, the cultural facilities, and the climate.

Organization and Population

The earliest regular settlement in Penobscot County was in Bangor in 1769. At that time it was part of Massachusetts, which covered a large part of New England. The county was incorporated by act of the Massachusetts Legislature in 1816 and included what later became Aroostook County. Bangor was made the county seat. Penobscot came from the Indian name, Penobscook or Penobskeag, signifying "the place of rocks."

The population of the area now constituting Penobscot County was approximately 1,000 in 1816. In 1870 the population was 75,000, the second highest in the State. This had increased to 126,346 in 1960.

Industries

A number of industries besides agriculture have contributed to the development of the county.

Lumbering and shipping were the main cause of the growth and development of the county. In 1826 the lumber carried by ships to coastal markets had an estimated value of $335,891. In 1837 there were 250 sawmills on the Penobscot River and its tributaries, and 200,000,000 board feet of lumber were sawed. In 1845 there were about 10 thousand men engaged in lumbering on the river. About the same number of horses and oxen were used to haul the lumber.

The present industries in the county include dairy plants, poultry plants, woolen mills, shoe factories, two canoe factories, metal-working plants, lumber mills, woodworking mills, and papermills. They are located principally in or near the towns of Old Town, Bangor, and Brewer, but some are also located in Newport, Corinna, Dexter, Lincoln, and Millinocket. One of the largest paper plants in the United States is in East Millinocket. Most of these industries have large payrolls, and the workers' families provide a good market for agricultural produce.

Transportation

Early transportation of produce was mainly by water. The first roads connected the settlements in the valley of Penobscot River. These were Indian trails slightly widened and improved to furnish rude highways for the wagons, horses, and oxen.

Today an extensive network of roads reaches into all of the agricultural areas of the county. Most places now are less than 7 miles from a trading center or store. The

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wilderness areas of the county are mostly inaccessible by highways but can be reached by logging roads, foot trails, boats, and canoes. Float planes are also used to fly from various places in the county and land on the numerous lakes of the northern woods.

The county now has several buslines, and trucking companies and three railroads. The railroads are Bangor and Aroostook, the Maine Central, and the Canadian Pacific. Northeast Airlines has a commercial airport in Bangor. There are also several smaller airports, private or commerical, some of which have seaplane service. Most of these are in and around Bangor, Old Town, Newport, and Millinocket.

Cultural Facilities

The settled part of Penobscot County has many educational facilities. The University of Maine is in Orono. Bangor has a theological seminary, a school of music, and two business schools. There is a preparatory school in Charleston. High schools are located in Lee, Lincoln, East Corinth, and Hampden, as well as in most of the larger towns. According to the 1954 census, the county had 23 public libraries and 7 private or university libraries.

The county has eight hospitals. They are located in Bangor, Lincoln, Millinocket, and Dexter. The State Hospital for mental health is just outside of Bangor.

Many faiths are represented in the county, particularly in the larger cities. Most of the rural or small communities have one or two churches. Grange halls are in nearly all of the organized communities.

Many areas of Penobscot County are excellent for vacationing. The area around Horse Mountain and northwest from Patten is part of Baxter State Park. This and other scenic places in the county offer most outdoor sports in season. The county has many beautiful lakes. All areas of scenic interest are served by inns, hunting, and fishing lodges, and private camps that may be rented by the week or season. Some of the more remote lakes can be reached only by float plane, on foot, or by horseback. A few woodsmen's cabins and campsites of the State Forest Service are the only facilities in these areas.

Climate

Penobscot County has a cold, humid, continental climate. The annual precipitation ranges from 35 to 40 inches. The winters are usually quite cold, and below zero temperatures are frequently recorded. Snowfall is heavy. The summers are generally cool and pleasant, and few temperatures above 90° are recorded.

Table 15 gives the monthly, seasonal, and annual temperature and precipitation as recorded at the U.S. Weather Bureau stations at Millinocket and Orono.

Elevations in the county range from nearly sea level around Orono to 2,400 feet or more near Mount Turner in the northwest and near Mount Chase north of Patten. The growing season, rainfall, and snowfall, therefore, vary considerably. Orono may have only a few inches of snow during the winter, whereas the Mount Chase and Mount Turner sections have several feet of snow. During summer Orono may have nearly droughty weather at the same time that the higher elevations have plentiful rainfall.

Summer and winter temperatures are generally lower in the northern areas and at the higher elevations. In the coastal lowlands, which extend partially into the

TABLE 15.—*Temperature and precipitation at two stations in Penobscot County, Maine*

[Millinocket, elevation, 388 feet]

Month	Temperature [1]			Precipitation [2]			
	Average	Absolute maximum	Absolute minimum	Average	Driest year (1941)	Wettest year (1954)	Average snowfall
	°F.	°F.	°F.	Inches	Inches	Inches	Inches
December	19.0	62	−35	3.54	3.33	5.59	18.9
January	13.6	57	−41	3.54	1.93	3.10	21.5
February	15.0	69	−35	2.79	1.15	5.03	20.8
March	27.0	73	−32	3.54	3.27	3.12	14.4
April	39.9	87	0	3.38	.35	4.16	7.0
May	52.6	96	19	3.16	2.42	4.66	.4
June	61.7	101	26	3.77	1.74	5.25	0
July	67.6	106	37	3.68	3.46	3.87	0
August	65.0	102	32	3.66	4.62	6.22	0
September	57.0	93	23	3.83	2.38	7.75	0
October	46.1	87	11	3.89	3.34	6.47	1.4
November	33.0	72	−10	3.71	3.09	3.82	8.4
Year	41.5	106	−41	42.49	31.08	59.04	92.8

[Orono, elevation, 115 feet]

Month	Temperature [1]			Precipitation [2]			
	Average	Absolute maximum	Absolute minimum	Average	Driest year (1921)	Wettest year (1888)	Average snowfall
	°F.	°F.	°F.	Inches	Inches	Inches	Inches
December	21.9	66	−36	3.48	1.01	4.96	11.7
January	17.9	65	−32	3.85	1.76	4.97	15.3
February	19.0	64	−31	3.39	1.98	6.11	16.5
March	29.3	83	−25	3.61	3.27	6.48	10.8
April	42.3	89	4	2.97	2.96	1.78	2.6
May	53.8	98	20	3.18	.71	2.82	.2
June	62.3	98	29	3.33	1.03	3.65	0
July	68.0	100	34	3.37	1.93	2.47	0
August	66.0	104	34	3.18	2.44	4.59	0
September	58.1	97	23	3.56	2.00	6.97	0
October	47.6	90	13	3.99	2.02	7.51	.1
November	35.7	78	−8	3.54	4.88	6.43	5.2
Year	43.5	104	−36	41.45	25.99	58.74	62.4

[1] Millinocket: Average temperature based on a 52-year record, through 1955; highest and lowest temperatures based on a 49-year record, through 1952. Orono: Average temperature based on a 57-year record, through 1953; highest temperature on a 68-year record and lowest temperature on a 69-year record, through 1952.

[2] Millinocket: Average precipitation based on a 55-year record, through 1955; wettest and driest years based on a 54-year record, in the period 1900–1955; snowfall based on a 46-year record, through 1952. Orono: Average precipitation based on an 85-year record, through 1954; wettest and driest years based on a 74-year record, in the period 1870–1954; snowfall based on a 15-year record, through 1952.

Penobscot Valley and the nearby central uplands, the growing season is 130 to 150 days. In the northern areas, however, it is only 110 to 120 days. In the far northern and mountainous areas, the growing season is often 90 to 100 days. This shorter growing season seriously limits the kinds of crops that can be grown. Potatoes and peas, for example, are better suited to short growing seasons than corn and tomatoes. It is imperative, therefore, that the crops one plans to grow are suited to the climate. At Orono the latest killing frost recorded in spring was on June 5, and the earliest in fall was on September 2. The average date of the latest killing frost in spring is May 8, and the average date of the first frost in fall is September 27.

Although most of Penobscot County has enough rainfall for crops, one area near the Dixmont Hills is somewhat deficient. In this area in the southeastern corner of the county, the rainfall ranges from 30 to 35 inches; whereas in the rest of the county it ranges from 35 to 40 inches or more. This is probably because the high Dixmont Hills cut off this area from the rain-laden coastal winds. Precipitation caused by these winds is therefore on the southern side of the hills. The rain falls on the northern side only when the winds come in from the northeast or southwest.

The climate of southern Penobscot County permits the growth of most crops suitable to this part of Maine. These include apples, pears, cherries, and blueberries; tomatoes, corn, potatoes, peas, beans, and other vegetables; and oats, alfalfa, clover, and similar crops. The climate in the northern part of the county, as well as at some of the higher elevations elsewhere, severely restricts the number of crops that can mature. Such crops as corn, apples, and tomatoes are not generally grown in these northern areas. Such crops as blueberries, peas, alfalfa, clover, oats, and potatoes should do very well on soils that are suited for them.

Agriculture

The pioneer farmers in Penobscot County subsisted primarily on what they raised on their farms and the additional income from game and furs. Many markets were later provided for farm products by the growing shipping industry in New England. Portland, Boston, and the Atlantic seaboard were among these markets. Lumbering in the county also increased demands for agricultural products—particularly hay and grain for horses and oxen.

Hay, corn, and wheat were the principal crops grown. Areas along waterways were cleared for hayfields. In these areas the soils that developed from silt, clay, and very fine sandy materials were predominant. Such soils are well suited to pasture, small grain, and hay. This natural alinement of soils and crops, although accidental, resulted in a profitable economy as long as hay was the base. When the lumbering industry declined, so did this economy. Today the emphasis is on pasture and forage crops, on dairy farms, and on canning crops and potatoes. Only a few farmers now produce wheat and rye.

About 336,000 acres is in farms, and much of this is in farm woodland. This is a small part of the county, but it represents an area as large as many counties on the Atlantic seaboard. The rest of the county is wooded. Large blocks of the wooded area are owned by paper companies and are used for the production of pulpwood.

Farming is still a leading enterprise in the county. According to the United States census, the value of all farm products sold, including forest products, was $10,813,813 in 1954 and $13,674,333 in 1959.

Land use, types and sizes of farms, principal crops and livestock raised, and other subjects needed to give a general idea of the agriculture of the county are discussed in the following paragraphs. Most of the statistics are from the United States census.

Land Use

The principal farming areas in Penobscot County are in the southwestern and central eastern wings and around Patten on the northeastern side (see fig. 6). These areas have the soils best suited to crops. They are the Plaisted-Thorndike-Howland association (PT), the Bangor-Dixmont-Thorndike association (BD), and the Bangor-Howland-Plaisted association (BP). (See the general soil map in the back of the report.) They are mostly on deep glacial till and are well drained to somewhat poorly drained. The largest areas of pasture and hay in the county are generally in the southern part of the valleys of the Penobscot and Kenduskeag Rivers in the Suffield-Buxton-Biddeford association (SB). Here many of the soils were derived from silt and clay. They have low acidity and medium to fine texture and are well drained to poorly drained.

The remaining areas of the county, except for the area on glacial outwash, are too stony, too wet, or too mountainous to be good farmland and are better suited as woodland. The area on glacial outwash—the Stetson-Machias-Allagash-Hadley association (SM)—needs irrigation, but it is otherwise well suited to farming.

Table 16, compiled from data from United States census reports, shows the various uses of farmland in 2 census years. The land in farms, as well as cropland harvested, shows a decrease from 1944 to 1959. Cropland used only for pasture, however, shows an increase.

TABLE 16.—*Various uses of farmland in stated years*

Use	1944	1959
	Acres	*Acres*
Land in farms	510, 215	336, 092
Cropland harvested	141, 021	66, 440
Cropland used only for pasture	7, 946	21, 991
Cropland not harvested and not pastured	14, 019	12, 194
Woodland pastured	66, 666	18, 992
Woodland not pastured	219, 682	188, 855
Other pasture (not cropland and not woodland)	49, 879	16, 875
Other land (house lots, roads, wasteland, etc.)	11, 002	10, 745

Number and Types of Farms

According to the United States census, the number of farms in Penobscot County was 2,219 in 1954, and 1,552

in 1959. The number of each type of farm in 1959 was as follows:

Type of farm:	Number
Dairy farms	460
Poultry farms	170
Field-crop farms other than vegetable and fruit-and-nut	74
Cash grain	11
Other field crops	63
Livestock farms other than poultry and dairy farms	21
Vegetable farms	5
Fruit-and-nut farms	0
General farms	36
Miscellaneous and unclassified farms	786

In 1959 the largest single enterprise was dairying. In that year dairy products sold accounted for about 39 percent of the farm income. In the same year poultry products accounted for about 32 percent; all crops, including forest products, for about 23 percent; and livestock and livestock products, other than poultry and dairy, for about 6 percent.

Most of the dairy farms are operated by people who do not generally raise cash crops. Some have orchards, and some have a few acres of beans, potatoes, or peas. Most of the dairy farms are in the southern part of the county. Here, the fine-textured and lime-bearing soils are well suited to pastures and hay.

The poultry farms are scattered throughout the county; many are on very shallow and rocky soils that are not suitable for crops. They produce mainly broilers. Feed is bought by some farmers for as many as 30,000 broilers. On the average, about 20,000 broilers are produced during a 10-week period. This operation is repeated three or four times a year. Some poultry farmers raise chickens for market and handle fewer broilers during the year because they sell hatching eggs.

On field-crop and general farms, the income is mainly from potatoes, oats, and the canning crops (beans and corn). On these farms are the medium and moderately coarse textured soils from glacial till. They occur in the principal farming sections—Exeter, Dexter, Garland, Corinna, Corinth, Lee, Springfield, Carroll, Drew, and Patten. Some of the farmers in the southern part of the county near Newport and Newburgh also grow orchard fruits. The orchards are usually on deep soils, but some are on the shallow Thorndike soils that are less suitable for apples.

Size of Farms

Although the number of farms has decreased during the last decade, the size has become steadily larger. This trend is partly the result of abandonment of smaller and less productive farms. The total number of farms fell from 3,288 in 1950 to 1,552 in 1959. The average size of farms, however, rose from 149 acres in 1950 to 217 acres in 1959. The largest group of farms had from 100 to 139 acres in 1950 and from 260 to 499 acres in 1959.

Many farms in Maine are large because they include woodlots. These woodlots are a source of wood for winter heat and for sale as pulpwood. They also produce maple syrup. About 15 percent of the county was in farms (including woodlots) in 1959. Only about 4½ percent, of the county, however, was in cropland.

The number of farms in the county in 1959, according to size group, was as follows:

Size of farms (acres) in 1959:	Number
Under 10	62
10 to 49	182
50 to 69	133
70 to 99	156
100 to 139	218
140 to 179	165
180 to 219	153
220 to 259	81
260 to 499	272
500 to 999	104
1,000 and more	26

Principal Crops

The principal crops in the county are hay and silage, potatoes, oats, corn, and field and seed beans (table 17). Sweet corn and snap beans are grown, but their acreage is not large. Apples, blueberries, strawberries, and raspberries are the principal fruits grown, but their combined area is less than a thousand acres. Acreages of nearly all of the principal crops have declined during the past decade.

TABLE 17.—*Acreage of the principal crops*

Crop	1944	1949	1954	1959
	Acres	*Acres*	*Acres*	*Acres*
All hay	113, 776	77, 910	61, 312	55, 321
Oats, wheat, barley, rye, or other small grains cut for hay	122	1, 438	918	749
Clover, timothy, and mixtures of clover and grasses cut for hay	42, 775	48, 078	49, 396	44, 628
Alfalfa and alfalfa mixtures cut for hay and for dehydrating	50	646	732	757
Other hay cut	70, 819	27, 000	8, 904	7, 517
Grass silage made from grasses, alfalfa, clover, or small grain	(1)	748	1, 362	1, 670
Irish potatoes harvested for home use or for sale	11, 322	[2] 7, 759	[3] 4, 696	[4] 4, 196
Dry field and seed beans	1, 361	2, 013	1, 083	444
Oats threshed or combined	7, 568	5, 627	3, 990	1, 965
Grains grown together and threshed as a mixture	(1)	420	110	(1)
Corn for all purposes	1, 414	1, 787	2, 020	1, 793
Harvested for grain	97	113	104	1
Cut for silage	(1)	1, 567	1, 815	1, 755
Hogged, grazed, or cut for fodder	(1)	107	101	37
Bearing and nonbearing fruit orchards, groves, vineyards, and planted nut trees	1, 198	1, 063	623	626
Sweet corn harvested for sale	1, 000	827	509	590
Snap beans harvested for sale	485	377	374	444
Blueberries	(1)	62	42	153
Strawberries	(1)	50	38	32
Raspberries	(1)	16	10	21

[1] Not reported.
[2] Does not include acreage for farms with less than 15 bushels harvested.
[3] Does not include acreage for farms with less than 20 bushels harvested.
[4] Does not include acreage for farms with less than 10 bushels harvested.

Timothy, smooth bromegrass, orchardgrass, and Kentucky bluegrass are the chief grasses grown for hay and pasture. Ladino, alsike, and red clovers, and birdsfoot trefoil (on wet soils) are the major legumes grown in seeding mixtures with the grasses. Alfalfa is grown in scattered areas, principally on the deeper soils from lime-bearing glacial till. More than 700 acres of alfalfa were reported in 1959. Except for oats, very little grain is grown in the county. Wheat, rye, millet, and other grains, however, are suitable.

Livestock

Cattle, mainly dairy cattle, provide the largest income from livestock in the county. The most common breeds of dairy cattle are Holstein, Guernsey, and Jersey; the most common breed of beef cattle is Hereford. The income from poultry is next to that from cattle. White Rock and White Rock crosses are raised for broilers. Crosses of Rhode Island Red and Barred Plymouth Rock are raised for the production of table and hatching eggs. Some farmers raise White Leghorns for the production of table eggs. The swine in the county are mostly crossbred Chester and Yorkshire. The sheep are mainly crosses of Hampshire, Romney, and Oxford. A few purebred sheep are also raised in the northern and east-central parts of the county.

The number of livestock on farms in the county in 1954 and 1959 are shown in table 18.

TABLE 18.—*Number of livestock*

Livestock	1954	1959
	Number	*Number*
Cattle and calves	30, 243	24, 509
Milk cows	14, 666	12, 409
Horses and mules	1, 409	857
Sheep and lambs	5, 105	5, 389
Swine	4, 840	3, 242
Chickens (4 months old or older)	220, 431	217, 887
Turkeys raised	10, 484	4, 878

Farm Facilities and Equipment

Many of the farms in Penobscot County have modern electrical equipment and plumbing. Some farms, however, still use kerosene for light and wood for fuel.

According to the 1954 census, of the 2,219 farms reported in the county, 2,078 (about 94 percent) had electricity and 1,535 (about 69 percent) had piped running water. In the 1959 census, the number of farms having electricity and running water was not reported. In this census, however, of the 1,552 farms reported, 1,204 (about 78 percent) had telephones, and 1,097 (about 71 percent) had tractors. The number of automobiles reported on farms was 1,552, the number of trucks was 1,334, and the number of tractors was 1,737. Many of the farms also have pickup hay balers, field forage harvesters, cornpickers, and potato diggers. Riding plows, harrows, and drags are all in common use. Ponds for livestock and fire protection are constructed on many farms. These have accessory pumps and waterlines operated by portable engines.

Markets

The farmers of the county have access to excellent markets. Bangor, one of the largest cities in Maine, and the industrial centers of Millinocket, East Millinocket, Lincoln, Howland, Dexter, Corinna, Newport, Brewer, Old Town, and Orono are markets for much of the agricultural produce. In addition, transportation facilities to Boston and Portland are good, and surpluses easily reach the industrial New England area. Plants for processing surplus poultry and dairy products are scattered over the county. Canning of peas has declined, but freezing is taking its place to some extent. Plants for processing beans, corn, and potatoes are still active.

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Glossary

ABC soil. A soil with a complete profile, including A, B, and C horizons.

AC soil. A soil with an incomplete profile. It has an A horizon and a C horizon, but no B horizon. Commonly such soils are young, like those developing from alluvium or on steep, rocky slopes.

Acid soil. Generally, a soil that is acid throughout most or all of its parts that plant roots occupy. Commonly applied to only the plowed layer or to some other specific layer or horizon in a soil. Practically, an acid soil has a pH value of more than 6.6; precisely, it has a pH value of less than 7.0.

Aggregate (of soil). Many fine soil particles held in a single mass or cluster, such as a clod, crumb, block, or prism. Many properties of the aggregate differ from those of an equal mass of unaggregated soil.

Alluvial soils. Soils developing from transported and relatively recently deposited material (alluvium) with little or no modification of the original materials by soil-forming processes. (Soils with well-developed profiles that have formed from alluvium are grouped with other soils having the same kinds of profiles, not with the alluvial soils.)

Available water in soils. The part of the water in the soil that can be taken up by plants at rates significant to their growth; usable; obtainable.

Azonal soils. A general group of soils having little or no soil profile development. Most of them are young. In the United States, Alluvial soils, Lithosols, and Regosols are included in the azonal group.

Base saturation. The relative degree to which soils have metallic cations absorbed. The proportion of the cation-exchange capacity that is saturated with metallic cations.

BC soil. A soil with a B horizon and a C horizon but with little or no A horizon. Most BC soils have lost their A horizon through erosion.

Bisequal soil. *See* **sequum.**

Bleicherde. The light-colored, leached A_2 horizon of the Podzol.

Blowout. An area from which soil material has been removed by wind. Such an area appears as a nearly barren, shallow depression with a flat or irregular floor consisting of a resistant layer, an accumulation of pebbles, or wet soil lying just above a water table.

Bog soil. An intrazonal group of soils that have mucky or peaty surface soil underlain by peat. Bog soils usually have swamp or marsh vegetation and are most common in humid regions.

Brown Podzolic soils. A zonal group of soils with thin mats of partly decayed leaves over thin, grayish-brown mixed humus and mineral soil. They lie over a yellow or yellowish-brown, acid B horizon, slightly richer in clay than the surface soil, or A horizon. These soils develop under deciduous or mixed deciduous and coniferous forests in cool-temperate, humid regions, such as parts of New England, New York, and western Washington.

Bulk density. The mass, or weight, of oven-dry soil per unit bulk volume, including air space. This mass in relation to the weight of a unit volume of water, was formerly called "apparent density" or "volume weight."

Calcareous soil. A soil containing calcium carbonate, or a soil alkaline in reaction because of the presence of calcium carbonate. A soil containing enough calcium carbonate to effervesce (fizz) when treated with dilute hydrochloric acid.

Catena. A group of soils, within a specific soil zone, formed from similar parent materials but with unlike soil characteristics because of differences in relief or drainage.

Cation. An ion carrying a positive charge of electricity. The common soil cations are calcium, magnesium, sodium, potassium, and hydrogen.

Cation exchange. The exchange of cations held by the soil-absorbing complex with other cations. Thus if a soil-absorbing complex is rich in sodium, treatment with calcium sulfate (gypsum) causes some calcium cations to exchange with some sodium cations.

Cation exchange capacity. A measure of the total amount of exchangeable cations that can be held by the soil. It is expressed in terms of milliequivalents per 100 grams of soil at neutrality (pH 7) or at some other stated pH value. (Formerly called base-exchange capacity.)

Clay. As a soil separate, the mineral soil particles less than 0.002 millimeter in diameter. As a soil textural class, soil material that contains 40 percent or more of clay, less than 45 percent of sand, and less than 40 percent of silt.

Clay loam. Soil material that contains 27 to 40 percent of clay and 20 to 45 percent of sand.

Claypan. A compact, slowly permeable soil horizon rich in clay and separated more or less abruptly from the overlying soil. Claypans are commonly hard when dry and plastic or stiff when wet.

Clod. A mass of soil, produced by plowing or digging, that usually slakes easily with repeated wetting and drying, in contrast to a ped, which is a natural soil aggregate.

Colluvium. Mixed deposits of soil material and rock fragments near the base of rather steep slopes. The deposits have accumulated through soil creep, slides, and local wash.

Complex, soil. An intimate mixture of tiny areas of different kinds of soil that are too small to be shown separately on a publishable soil map. The whole group of soils must be shown together as a mapping unit and described as a pattern of soils.

Concretions. Hard grains, pellets, or nodules from concentrations of compounds in the soil that cement the soil grains together. The composition of some concretions is unlike that of the surrounding soil. Concretions can be of various sizes, shapes, and colors.

Consistence. The combination of properties of soil material that determine its resistance to crushing and its ability to be molded or changed in shape. Consistence depends mainly on the forces

of attraction between soil particles. Consistence is described by such words as *loose, friable, firm, soft, plastic,* and *sticky.*

Continental climate. A general term for the climate typical of great land masses where wide ranges in temperature and other weather conditions occur because the area is not greatly influenced by nearness to the sea. Much of the United States has a continental climate.

Contour farming. Plowing, cultivating, planting, and harvesting in rows that are at right angles to the natural direction of the slope or that are parallel to terrace grades.

Crumb structure. Very porous, granular structure in soils.

Diversion ditch. A ridge of earth that is built to divert runoff from its natural course and, thus, to protect areas downslope from the effects of such runoff.

D layer. Any stratum underlying the soil profile that is unlike the material from which the soil has been formed.

Drainage, soil. The relative rapidity and extent of removal of water from on and within the soil, under natural conditions. Terms commonly used to describe drainage classes of soil are as follows:

Very poorly drained. Water is removed so slowly that the soil remains wet most of the time, and water ponds on the surface frequently.

Poorly drained. Water is removed so slowly that the soil is wet for a large part of the time.

Imperfectly or somewhat poorly drained. Water is removed from the soil slowly enough to keep it wet for significant periods but not all of the time.

Moderately well drained. Water is removed from the soil somewhat slowly, so that the profile is wet for a small but significant part of the time.

Well drained. Water is removed from the soil readily but not rapidly.

Somewhat excessively drained. Water is removed from the soil rapidly.

Excessively drained. Water is removed from the soil very rapidly.

Drift. Material of any sort deposited by geological processes in one place after having been removed from another. Glacial drift includes the materials deposited by glaciers and by the streams and lakes associated with them.

Duff. The matted, partly decomposed organic surface layer of forested soils.

Dune. A mound or ridge of loose sand piled up by the wind. Occasionally during periods of extreme drought, granulated soil material of fine texture may be piled into low dunes, sometimes called clay dunes.

Eluviation. The movement of material from one place to another within the soil in either true solution or colloidal suspension. Soil horizons that have lost material through eluviation are said to be eluvial; those that have received material are illuvial. With an excess of rainfall over evaporation, eluviation may take place, either downward or laterally according to the direction of water movement. The term refers especially to the movement of soil colloids in suspension; leaching refers to the removal of soluble materials such as salt in true solution.

Erosion. The wearing away of the land surface by detachment and transport of soil and rock materials through the action of moving water, wind, or other geological agents.

Fertility, soil. The quality of a soil that enables it to provide compounds, in adequate amounts and in proper balance, for the growth of specified plants, when other growth factors such as light, moisture, temperature, and the physical condition of the soil are favorable.

Fine-textured soil. Roughly, clayey soil containing 35 percent or more of clay.

Fragipan. A dense and brittle pan, or layer, in a soil that owes its hardness mainly to extreme density or compactness rather than to high clay content or cementation. Removed fragments are friable, but the material in place is so dense that roots cannot penetrate and water moves through it very slowly because of small pore size.

Gley soil. A soil horizon in which waterlogging and lack of oxygen have caused the material to be a neutral gray in color. The term "gleyed" is applied, as in "moderately gleyed soil," to soil horizons with yellow and gray mottling caused by intermittent waterlogging.

Granular structure. Soil structure in which the individual grains are grouped into spherical aggregates with indistinct sides. Highly porous granules are commonly called crumbs. A well-granulated soil has the best structure for most ordinary crop plants.

Gray-Brown Podzolic soils. A zonal group of soils having thin organic coverings and thin organic-mineral layers over grayish-brown leached layers that rest upon brown B horizons richer in clay than the soil horizon above. These soils have formed under deciduous forests in a moist temperate climate.

Great soil group. Any one of several broad groups of soil with fundamental characteristics in common. Examples are Podzols, Gray-Brown Podzolic soils, and Low-Humic Gley soils.

Hardpan. A hardened or cemented soil horizon or layer. The soil material may be sandy or clayey and may be cemented by iron oxide, silica, calcium carbonate, or other substances.

Heavy soil. An old term formerly used for clayey or fine-textured soils. (The term originated from the heavy draught on the horses when plowing.)

Horizon, soil. A layer of soil, approximately parallel to the soil surface, with distinct characteristics produced by soil-forming processes.

A horizon. The surface horizon of a mineral soil having maximum biological activity, or eluviation (removal of materials dissolved or suspended in water), or both.

B horizon. A soil horizon, usually beneath an A horizon, or surface soil, in which (1) clay, iron, or aluminum, with accessory organic matter, have accumulated by receiving suspended material from the A horizon above it or by clay development in place; (2) the horizon has a blocky or prismatic structure; or (3) the horizon has some combination of these features. In soils with distinct profiles, the B horizon is roughly equivalent to the general term "subsoil."

C horizon. The unconsolidated rock material in the lower part of the soil profile like that from which the upper horizons (or at least a part of the B horizon) have developed.

Humic acids. Alkali soluble end products of the decomposition of organic matter in soil and in composts. The term sometimes is used interchangeably for humus.

Humus. The well-decomposed, more or less stable part of the organic matter in mineral soils.

Illuviation. An accumulation of material in a soil horizon through the deposition of suspended mineral and organic matter originating from horizons above. Since at least part of the fine clay in the B horizon (or subsoil) of many soils has moved into it from the A horizon above, the B horizon is called an illuvial horizon.

Immature soil. A soil lacking clear individual horizons because of the relatively short time for soil-building forces to act upon the parent material since its deposition or exposure.

Impervious soil. A soil through which water, air, or roots penetrate slowly or not at all. No soil is absolutely impervious to water and air all the time.

Inorganic. Refers to substances occurring as minerals in nature or that can be obtained from them by chemical means. Refers to all matter except the compounds of carbon, but includes carbonates.

Intrazonal soil. Any one of the great groups of soils having more or less well-developed soil characteristics that reflect a dominating influence of some local factor of relief or of parent material over the normal influences of the climate and the vegetation on the soil-forming processes. Such groups of soils may be geographically associated with two or more of the zonal groups of soils, which have characteristics dominated by the influence of climate and vegetation.

Kettle holes. Steep-sided depressions, usually a few acres in size.

Lacustrine deposits. Materials dropped from lake water. Many nearly level soils have developed from such deposits left in old lakes that have long since disappeared.

Land-capability classification. A grouping of kinds of soil into special units, subclasses, and classes according to their capability for intensive use and the treatments required for sustained use.

Leaching. The removal of materials in solution by the passage of water through soil.

Leveling (of land). The reshaping or modification of the land surface to a planned grade to provide a more suitable surface for the efficient application of irrigation water and to provide good surface drainage.

Light soil. An old term formerly used for sandy, or coarse-textured, soils.

Lime. Generally the term lime, or agricultural lime, is applied to ground limestone (calcium carbonate), hydrated lime (calcium hydroxide), or burned lime (calcium oxide), with or without mixtures of magnesium carbonate, magnesium hydroxide, or magnesium oxide, and materials such as basic slag, used as amendments to reduce the acidity of acid soils. In strict chemical terminology, lime refers to calcium oxide (CaO), but by an extension of meaning it is now used for all limestone-derived materials applied to neutralize acid soils.

Lithosol. A soil having little or no evidence of soil development and consisting mainly of a partly weathered mass of rock fragments or of nearly barren rock.

Loam. The textural class name for soil having a moderate amount of sand, silt, and clay. Loam soils contain 7 to 27 percent of clay, 28 to 50 percent of silt, and less than 52 percent of sand. (In the old literature, especially English literature, the term "loam" applied to mellow soils rich in organic matter, regardless of the texture. As used in the United States, the term refers only to the relative amounts of sand, silt, and clay; loam soils may or may not be mellow.)

Loamy soil. A general expression for soils of intermediate texture between the coarse-textured (sandy) soils, on the one hand, and the fine-textured (clayey) soils on the other. Sandy loams, loams, silt loams, and clay loams are regarded as loamy soils.

Mature soil. Any soil with well-developed soil horizons having characteristics produced by the natural processes of soil formation and in near equilibrium with its present environment.

Mechanical analysis. The physical analysis of soil materials to determine the amounts of the various soil separates, or grain-size fractions.

Microrelief. Small-scaled differences in relief, such as small mounds, swales, or pits, that are a few feet across and have differences in elevation of a few inches to around 3 feet that are significant to soil-forming processes, to growth of plants, or to preparing the soil for cultivation.

Mineral soil. A general term for a soil composed chiefly of mineral matter, in contrast to an organic soil, which is composed chiefly of organic matter.

Moisture tension. The force at which water is held by soil; usually expressed as the equivalent of a unit column of water in centimeters; 1,000 centimeters equal 1 atmosphere equivalent tension. Moisture tension increases with dryness and indicates the degree of work required to remove soil moisture for use by plants.

Mor. Raw humus; a type of forest humus layer consisting of unincorporated organic material, usually matted or compacted or both; distinct from the mineral soil, unless the latter has been blackened by the washing in of organic matter.

Morphology, soil. The constitution of the soil, including the texture, structure, consistence, color, and other physical, chemical, and biological properties of the various soil horizons that make up the soil profile.

Mottled. Soil horizons irregularly marked with spots of color. A common cause of mottling is imperfect or impeded drainage, although there are other causes, such as soil development from an unevenly weathered rock. Different kinds of minerals may cause mottling.

Muck. Highly decomposed organic soil material developed from peat. Generally, muck has a higher mineral or ash content than peat and is decomposed to the point that the original plant parts cannot be identified.

Mull. A humus-rich layer on forested soils consisting of mixed organic and mineral matter. A mull blends into the upper mineral layers without an abrupt change.

Neutral soil. A soil that is neither significantly acid nor alkaline. Strictly, a neutral soil has pH of 7.0; in practice, a neutral soil has a pH between 6.6 and 7.3.

Order. The highest category in soil classification. The three orders are zonal soils, intrazonal soils, and azonal soils.

Organic soil. A general term applied to a soil or to a soil horizon that consists primarily of organic matter, such as peat soils, muck soils, and peaty soil layers. Organic, as used in chemistry, refers to the compounds of carbon.

Orterde. Horizons in which sesquioxides and organic matter have accumulated without cementation.

Ortstein. The B horizon, in Podzols, that is cemented by accumulated sesquioxides.

Pan. A layer or soil horizon within a soil that is firmly compacted or is very rich in clay. Examples include hardpans, fragipans, claypans, and traffic pans.

Parent material. The unconsolidated mass of rock material (or peat) from which the soil profile develops.

Peat. Unconsolidated soil material consisting largely of undecomposed or only slightly decomposed organic matter that accumulated under conditions of excessive moisture.

Ped. An individual natural soil aggregate, such as a crumb, prism, or block, in contrast to a clod, which is a mass of soil brought about by digging or other disturbance.

Pedology. The science that treats of soil.

Permeability. That quality of the soil that enables it to transmit water or air. Terms used to describe permeability are: *Very slow, slow, moderately slow, moderate, moderately rapid, rapid*, and *very rapid*.

pH. A numerical designation of relatively weak acidity and alkalinity, as in soils and other biological systems. Technically, pH is the common logarithm of the reciprocal of the hydrogen-ion concentration of a solution. A pH of 7.0 indicates precise neutrality, higher values indicate increasing alkalinity, and lower values indicate increasing acidity.

Phase, soil. The subdivision of a soil type or other classificational soil unit having variations in characteristics not significant to the classification of the soil in its natural landscape but significant to the use and management of the soil. Examples of the variations recognized by phases of soil types include differences in slope, in stoniness, and in thickness because of accelerated erosion. Bangor silt loam, 0 to 2 percent slopes, is a soil phase.

Platy soil structure. Soil aggregates with thin, vertical axes and long horizontal axes. Flat; one dimension much smaller than the other two.

Podzol. A zonal group of soils having surface organic mats and thin, organic-mineral horizons above gray leached horizons that rest upon illuvial dark-brown horizons, developed under coniferous or mixed forests or under heath vegetation in a cool-temperate, moist climate.

Podzolic soil. Soils that have part or all of the characteristics of the Podzol soils, especially leached surface soils that are poorer in clay than the B horizons beneath.

Podzolization. The process by which soils are depleted of bases, become more acid, and develop leached surface layers from which clay has been removed.

Profile (soil). A vertical section of the soil through all its horizons and extending into the parent material.

Puddled soil. Dense, massive soil artificially compacted when wet and having no regular structure. The condition commonly results from tillage of a clayey soil when it is wet.

Reaction, soil. The degree of acidity or alkalinity of a soil mass, expressed in either pH value or in words, as follows:

	pH		*pH*
Extremely acid	Below 4.5	Neutral	6.6–7.3
Very strongly acid	4.5–5.0	Mildly alkaline	7.4–7.8
Strongly acid	5.1–5.5	Moderately alkaline	7.9–8.4
Medium acid	5.6–6.0	Strongly alkaline	8.5–9.0
Slightly acid	6.1–6.5	Very strongly alkaline	9.1 and higher

Regolith. The unconsolidated mantle of weathered rock and soil material on the earth's surface; the loose earth materials above solid rock. Only the upper part of this, modified by organisms and other soil-building forces, is regarded by soil scientists as soil. In soil mechanics, however, most American engineers speak of the whole regolith, even to great depths, as "soil."

Regosol. An azonal group of soils developing from deep, unconsolidated or soft, rocky deposits, and without definite genetic horizons.

Residual material. Unconsolidated and partly weathered parent material for soils, which is presumed to have developed from the same kind of rock as that on which it lies. The term "residual" is sometimes incorrectly applied to soils, but it can be applied correctly only to the material from which soils have formed.

Runoff. The surface flow of water from an area, or the total volume of surface flow during a specified time.

Sand. Individual rock or mineral fragments in soils having diameters ranging from 0.05 millimeter to 2.0 millimeters. Usually sand grains consist chiefly of quartz, but they may be of any mineral composition. The textural class name of any soil that contains 85 percent or more of sand and not more than 10 percent of clay.

Sandy clay. Soil of this textural class contains 35 percent or more of clay and 45 percent or more of sand.

Sandy clay loam. Generally, soil of this textural class contains 20 to 35 percent clay, less than 28 percent silt, and 45 percent or more of sand.

Sandy loam. Generally, soil of the sandy loam class of texture has 50 percent sand and less than 20 percent clay.

Sandy soil. A broad term for soils of the sand and loamy sand classes; soil material with more than 70 percent sand and less than 15 percent clay.

Separate, soil. One of the individual size groups of mineral soil particles—sand, silt, or clay.

Sequum. A sequence in a soil profile consisting of an eluvial horizon and its related illuvial horizon, if present. Two sequa may be present in a single profile, and that soil could then be called a bisequal soil.

Series, soil. A group of soils that have soil horizons similar in their differentiating characteristics and arrangement in the soil profile, except for the texture of the surface soil, and that formed from a particular type of parent material. The soil series is an important category in detailed soil classification. Individual series are given proper names from place names near the place of first recorded occurrence. Thus names like Adams, Bangor, and Colton are names of soil series that appear on soil maps, and each name connotes a unique combination of many soil characteristics.

Silt. (1) Individual mineral particles of soil that range in diameter between the upper size of clay, 0.002 millimeter, and the lower size of very fine sand, 0.05 millimeter. (2) Soil of the textural class silt contains 80 percent or more of silt and less than 12 percent of clay. (3) Sediments deposited from water in which the individual grains are approximately of the size of silt, although the term is sometimes applied loosely to sediments containing considerable sand and clay.

Silt loam. Soil material having (1) 50 percent or more of silt and 12 to 27 percent of clay or (2) 50 to 80 percent of silt and less than 12 percent of clay.

Silty clay. Soil of this textural class has 40 percent or more of clay and 40 percent or more of silt.

Silty clay loam. Soil of this textural class has 27 to 40 percent of clay and less than 20 percent of sand.

Single grain soil. A structureless soil in which each particle exists separately, as in dune sand.

Soil association. A group of defined and named kinds of soil associated together in a characteristic geographic pattern.

Solum. The upper part of a soil profile, above the parent material, in which the processes of soil formation are active. The solum in mature soils includes the A and B horizons.

Sphagnum. A group of mosses which grow in moist places. By annual increments of growth, deep layers of fibrous and highly absorbent peat may be built up. Sphagnum grows best in cool, humid regions.

Stripcropping. The practice of growing crops in a systematic arrangement of strips, or bands. Commonly cultivated crops and sod crops are alternated in strips to protect the soil and vegetation against running water or wind. The alternate strips are laid out approximately on the contour on erodible soils or at approximate right angles to the prevailing direction of the wind where soil blowing is a hazard.

Structure, soil. The arrangement of the primary soil particles into lumps, granules, or other aggregates. Structure is described by grade—*weak, moderate,* or *strong,* that is, the distinctness and durability of the aggregates; by the size of the aggregates—*very fine, fine, medium, coarse,* or *very coarse;* and by their type (shape and arrangement of peds)—*platy, prismatic, columnar, blocky, subangular blocky, granular,* or *crumb.* A soil is described as structureless if there are no observable aggregates. Structureless soils may be massive (coherent) or single grain (noncoherent). The principal types of soil structure are defined as follows.

Blocky. Aggregates are shaped like blocks; they may have flat or rounded surfaces.

Blocky, subangular. Aggregates have some rounded and some flat surfaces; upper sides are rounded.

Columnar. Aggregates are prismatic and are rounded at the top.

Crumb. Aggregates are generally soft, small, porous, and irregular, but tend toward a spherical shape.

Granular. Aggregates are roughly spherical, firm, and small. They may be either hard or soft but are generally more firm and less porous than crumb and are without the distinct faces of blocky structure.

Platy. Aggregates are flaky or platelike.

Prismatic. Aggregates have flat vertical surfaces, and their height is greater than their width.

Subsoil. The B horizons of soils with distinct profiles. In soils with weak profile development, the subsoil can be defined as the soil below the plowed soil (or its equivalent of surface soil) in which roots normally grow.

Substratum. Any layer lying beneath the solum, or true soil. The term is applied to parent materials and to other layers unlike the parent material that are below the B horizon or subsoil.

Surface soil. The soil ordinarily moved in tillage, or its equivalent in uncultivated soil, about 5 to 8 inches in thickness.

Terrace (geological). A nearly level or undulating plain, commonly rather narrow and usually with a steep front, bordering a river, a lake, or the sea. Although many old terraces have become more or less hilly through dissection by streams, they are still regarded as terraces.

Texture, soil. The relative proportions of the various size groups of individual soil grains in a mass of soil. Specifically, it refers to the proportions of sand, silt, and clay. Some textural names commonly used in this report are *loamy sand, fine sandy loam, silt loam, gravelly sandy loam,* and *very stony silt loam.*

Tilth, soil. The physical condition of a soil in respect to its fitness for the growth of a specified plant or sequence of plants. Ideal soil tilth is not the same for each kind of crop, nor is it uniform for the same kind of crop growing on contrasting kinds of soil.

Topography. The shape of the ground surface, such as hills, mountains, or plains. Steep topography indicates steep slopes or hilly land; flat topography indicates flat land with minor undulations and gentle slopes.

Topsoil. A general term used in at least four different senses: (1) A presumed fertile soil or soil material, usually rich in organic matter, used to topdress roadbanks, lawns, and gardens; (2) the surface plow layer of a soil and thus a synonym for surface soil; (3) the original or present dark-colored upper soil, which ranges from a mere fraction of an inch to 2 or 3 feet in the different kinds of soil; and (4) the original or present A horizon, varying widely among different kinds of soil. Applied to soils in the field, the term has no precise meaning unless defined as to depth or productivity in relation to a specific kind of soil.

Type, soil. A subgroup or category under the soil series based on the texture of the surface soil. A soil type is a group of soils having horizons similar in differentiating characteristics and arrangements in the soil profile and developed from a particular type of parent material. The name of a soil type consists of the name of the soil series plus the textural class name of the upper part of the soil equivalent to the surface soil. Thus, Bangor silt loam is the name of a soil type within the Bangor series.

Water-holding capacity. The capacity (or ability) of the soil to hold water; field capacity is the amount held against gravity or 1 atmosphere tension, or pF 2.7. The moisture-holding capacity of sandy soils is usually considered to be low, but that of clayey soils is high. Often expressed in inches of water per inch of depth of soil.

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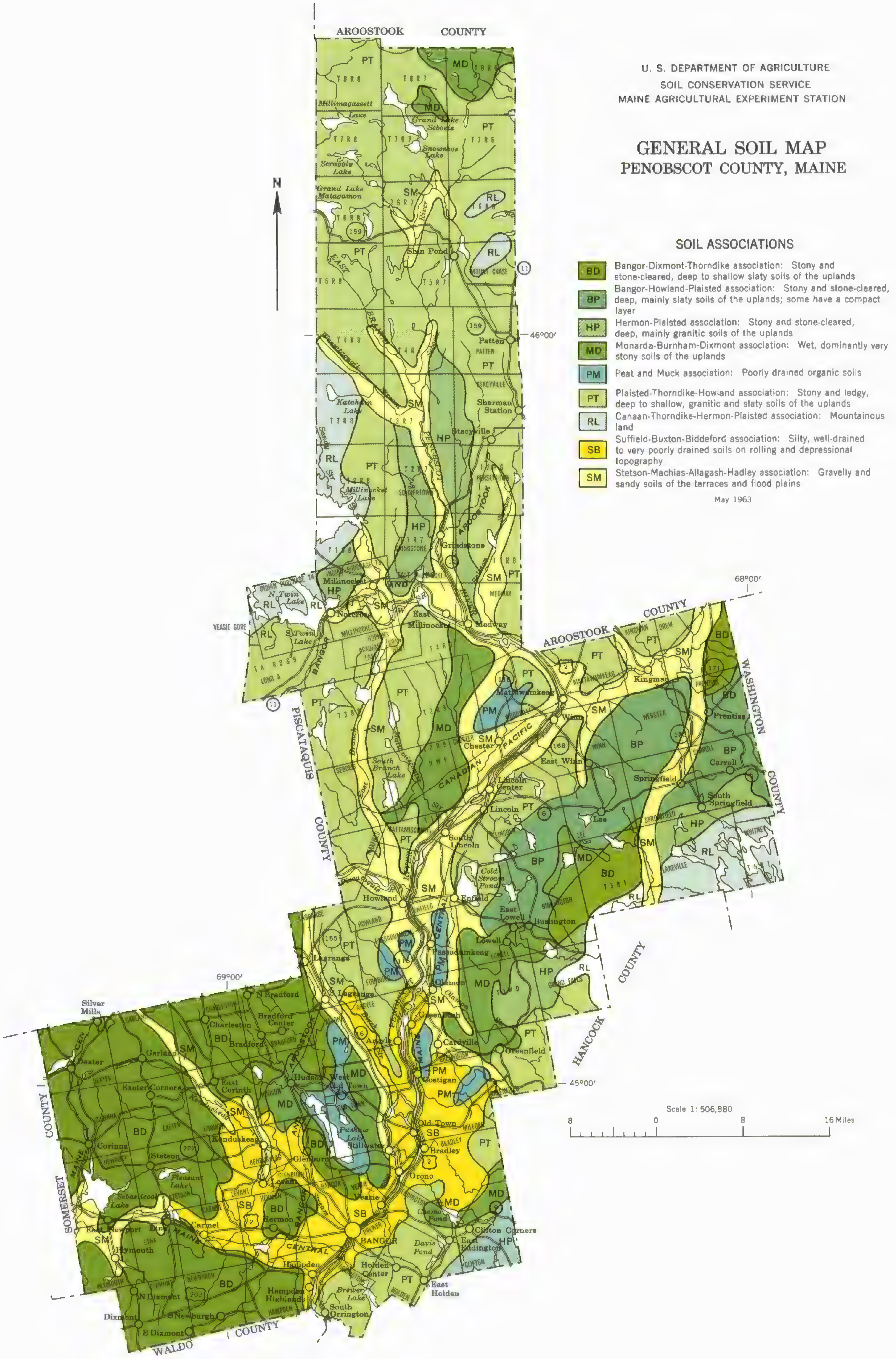
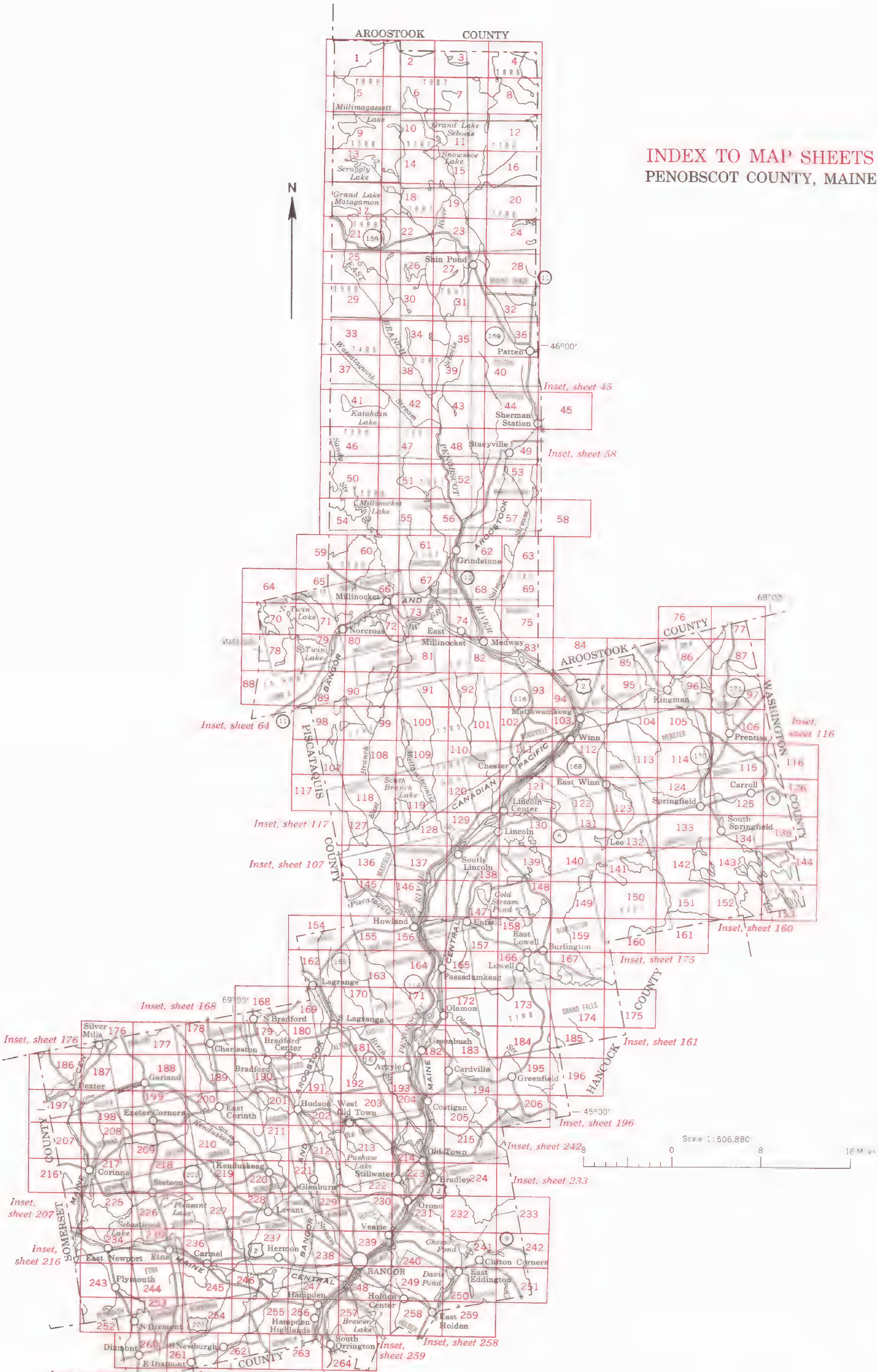

U. S. DEPARTMENT OF AGRICULTURE
SOIL CONSERVATION SERVICE
MAINE AGRICULTURAL EXPERIMENT STATION
GENERAL SOIL MAP
PENOBSCOT COUNTY, MAINE
SOIL ASSOCIATIONS
BD Bangor-Dixmont-Thorndike association: Stony and stone-cleared, deep to shallow slaty soils of the uplands
BP Bangor-Howland-Plaisted association: Stony and stone-cleared, deep, mainly slaty soils of the uplands; some have a compact layer
HP Hermon-Plaisted association: Stony and stone-cleared, deep, mainly granitic soils of the uplands
MD Monarda-Burnham-Dixmont association: Wet, dominantly very stony soils of the uplands
PM Peat and Muck association: Poorly drained organic soils
PT Plaisted-Thorndike-Howland association: Stony and ledgy, deep to shallow, granitic and slaty soils of the uplands
RL Canaan-Thorndike-Hermon-Plaisted association: Mountainous land
SB Suffield-Buxton-Biddeford association: Silty, well-drained to very poorly drained soils on rolling and depressional topography
SM Stetson-Machias-Allagash-Hadley association: Gravelly and sandy soils of the terraces and flood plains
May 1963
Scale 1: 506,880
8 0 8 16 Miles
N
AROOSTOOK COUNTY
PISCATAQUIS COUNTY
WASHINGTON COUNTY
HANCOCK COUNTY
WALDO COUNTY
SOMERSET COUNTY
46°00′
45°00′
68°00′
69°00′
Patten
Sherman Station
Stacyville
Grindstone
Medway
East Millinocket
Millinocket
Norcross
Mattawamkeag
Winn
Kingman
Prentiss
Chester
East Winn
Lincoln Center
Lincoln
South Lincoln
Springfield
Carroll
South Springfield
Lee
Howland
Enfield
East Lowell
Burlington
Lowell
Passadumkeag
Lagrange
Olamon
Greenbush
Alton
Cardville
Greenfield
Costigan
Old Town
Bradley
Orono
Stillwater
Hudson
West Old Town
Kenduskeag
Glenburn
Levant
Veazie
Bangor
Brewer
Hermon
Carmel
Etna
East Newport
Plymouth
Hampden
Hampden Highlands
Holden Center
East Holden
East Eddington
Clifton Corners
South Orrington
N Dixmont
Dixmont
E Dixmont
S Newburgh
Dexter
Garland
Exeter Corners
East Corinth
Corinna
Stetson
Charleston
Bradford
Bradford Center
N Bradford
Silver Mills



INDEX TO MAP SHEETS
PENOBSCOT COUNTY, MAINE

U. S. DEPARTMENT OF AGRICULTURE
SOIL CONSERVATION SERVICE

PENOBSCOT COUNTY, MAINE

MAINE AGRICULTURAL EXPERIMENT STATION

SOIL LEGEND

The first capital letter is the initial one of the soil name. A second capital letter, A, B, C, D, or E, shows the slope. Symbols without a slope letter are those of nearly level soils, such as Limerick silt loam, or of land types, such as Rock outcrop, which have a considerable range of slope. A final number 2, in the symbol, shows that the soil is eroded.

SYMBOL	NAME
AaB	Adams loamy sand, 0 to 8 percent slopes
AaC	Adams loamy sand, 8 to 15 percent slopes
AaE	Adams loamy sand, 15 to 45 percent slopes
AgA	Allagash fine sandy loam, 0 to 2 percent slopes
AgB	Allagash fine sandy loam, 2 to 8 percent slopes
AgC	Allagash fine sandy loam, 8 to 15 percent slopes
AgD	Allagash fine sandy loam, 15 to 25 percent slopes
BaA	Bangor silt loam, 0 to 2 percent slopes
BaB	Bangor silt loam, 2 to 8 percent slopes
BaC	Bangor silt loam, 8 to 15 percent slopes
BaD	Bangor silt loam, 15 to 25 percent slopes
BmB	Bangor silt loam, moderately deep, 2 to 8 percent slopes
BmC	Bangor silt loam, moderately deep, 8 to 15 percent slopes
BmD	Bangor silt loam, moderately deep, 15 to 35 percent slopes
BnB	Bangor very stony silt loam, 0 to 8 percent slopes
BnC	Bangor very stony silt loam, 8 to 15 percent slopes
BnD	Bangor very stony silt loam, 15 to 25 percent slopes
BoA	Biddeford silt loam, 0 to 3 percent slopes
BrA	Burnham silt loam, 0 to 3 percent slopes
BuA	Buxton silt loam, 0 to 2 percent slopes
BuB	Buxton silt loam, 2 to 8 percent slopes
BuC	Buxton silt loam, 8 to 15 percent slopes
BxB	Buxton, Scantic, and Biddeford stony silt loams, 0 to 8 percent slopes
CaC	Canaan extremely rocky sandy loam, 5 to 15 percent slopes
CaE	Canaan extremely rocky sandy loam, 15 to 45 percent slopes
CcB	Colton cobbly sandy loam, dark materials, 0 to 8 percent slopes
CcC	Colton cobbly sandy loam, dark materials, 8 to 15 percent slopes
CcD	Colton cobbly sandy loam, dark materials, 15 to 25 percent slopes
CcE	Colton cobbly sandy loam, dark materials, 25 to 45 percent slopes
CnA	Colton gravelly sandy loam, dark materials, 0 to 2 percent slopes
CnB	Colton gravelly sandy loam, dark materials, 2 to 8 percent slopes
CnC	Colton gravelly sandy loam, dark materials, 8 to 15 percent slopes
CnD	Colton gravelly sandy loam, dark materials, 15 to 25 percent slopes
CnE	Colton gravelly sandy loam, dark materials, 25 to 45 percent slopes
CsA	Colton loamy fine sand, dark materials, 0 to 2 percent slopes
CsB	Colton loamy fine sand, dark materials, 2 to 8 percent slopes
CsC	Colton loamy fine sand, dark materials, 8 to 15 percent slopes
CsD	Colton loamy fine sand, dark materials, 15 to 25 percent slopes
DaA	Daigle silt loam, 0 to 2 percent slopes
DaB	Daigle silt loam, 2 to 8 percent slopes
DaC	Daigle silt loam, 8 to 15 percent slopes
DgA	Daigle stony silt loam, 0 to 2 percent slopes
DgB	Daigle stony silt loam, 2 to 8 percent slopes
DgC	Daigle stony silt loam, 8 to 15 percent slopes
DxA	Dixmont silt loam, 0 to 2 percent slopes
DxB	Dixmont silt loam, 2 to 8 percent slopes
DxC	Dixmont silt loam, 8 to 15 percent slopes
DyA	Dixmont very stony silt loam, 0 to 2 percent slopes
DyB	Dixmont very stony silt loam, 2 to 8 percent slopes
DyC	Dixmont very stony silt loam, 8 to 15 percent slopes
EwB	Elmwood fine sandy loam, 0 to 8 percent slopes
Ha	Hadley silt loam
HbB	Hermon sandy loam, 2 to 8 percent slopes
HbC	Hermon sandy loam, 8 to 15 percent slopes
HdB	Hermon sandy loam, moderately deep, 2 to 8 percent slopes
HdC	Hermon sandy loam, moderately deep, 8 to 15 percent slopes
HeB	Hermon very stony sandy loam, 2 to 8 percent slopes
HeC	Hermon very stony sandy loam, 8 to 15 percent slopes
HeE	Hermon very stony sandy loam, 15 to 45 percent slopes
HhC	Hermon extremely stony sandy loam, 5 to 15 percent slopes
HoB	Howland gravelly loam, 0 to 8 percent slopes
HoC	Howland gravelly loam, 8 to 15 percent slopes
HvB	Howland very stony loam, 0 to 8 percent slopes
HvC	Howland very stony loam, 8 to 15 percent slopes
HvD	Howland very stony loam, 15 to 25 percent slopes
Lk	Limerick silt loam
MaB	Machias fine sandy loam, 0 to 8 percent slopes
MbB	Madawaska very fine sandy loam, 0 to 8 percent slopes
Md	Made land
MeA	Melrose fine sandy loam, 0 to 2 percent slopes
MeB	Melrose fine sandy loam, 2 to 8 percent slopes
MeC	Melrose fine sandy loam, 8 to 15 percent slopes
Mn	Mixed alluvial land
MoB	Monarda silt loam, 0 to 8 percent slopes
MrB	Monarda and Burnham very stony silt loams, 0 to 8 percent slopes
MsC	Monarda and Burnham extremely stony silt loams, 0 to 15 percent slopes
Mu	Muck
On	Ondawa fine sandy loam
Pa	Peat and muck
Pc	Peat, coarsely fibrous
Pf	Peat, moderately fibrous
PgB	Plaisted gravelly loam, 2 to 8 percent slopes
PgC	Plaisted gravelly loam, 8 to 15 percent slopes
PgD	Plaisted gravelly loam, 15 to 25 percent slopes
PgE	Plaisted gravelly loam, 25 to 45 percent slopes
PhB	Perham silt loam, 0 to 8 percent slopes
PhC	Perham silt loam, 8 to 15 percent slopes
PmB	Perham stony silt loam, 0 to 8 percent slopes
PmC	Perham stony silt loam, 8 to 15 percent slopes
PrC	Plaisted very stony loam, 5 to 15 percent slopes
PrE	Plaisted very stony loam, 15 to 45 percent slopes
Ps	Peat, sphagnum
PxC	Plaisted extremely stony loam, 5 to 15 percent slopes
Py	Podunk fine sandy loam
RaB	Red Hook and Atherton silt loams, 0 to 8 percent slopes
RdB	Red Hook and Atherton fine sandy loams, 0 to 8 percent slopes
Re	Riverwash
RkC	Rockland, Canaan material, sloping
RkD	Rockland, Canaan material, strongly sloping
RmC	Rockland, Thorndike material, sloping
RmD	Rockland, Thorndike material, strongly sloping
Ro	Rock outcrop
Sa	Saco silt loam
ScB	Scantic silt loam, 0 to 8 percent slopes
SeA	Stetson fine sandy loam, 0 to 2 percent slopes
SeB	Stetson fine sandy loam, 2 to 8 percent slopes
SeC	Stetson fine sandy loam, 8 to 15 percent slopes
SeD	Stetson fine sandy loam, 15 to 25 percent slopes
SfC	Stetson-Suffield complex, 0 to 15 percent slopes
SfE	Stetson-Suffield complex, 15 to 45 percent slopes
ShD	Stony land, Hermon material, strongly sloping
SpD	Stony land, Plaisted material, strongly sloping
SuA	Suffield silt loam, 0 to 2 percent slopes
SuB	Suffield silt loam, 2 to 8 percent slopes
SuC	Suffield silt loam, 8 to 15 percent slopes
SuC2	Suffield silt loam, 8 to 15 percent slopes, eroded
SuD	Suffield silt loam, 15 to 25 percent slopes
SuD2	Suffield silt loam, 15 to 25 percent slopes, eroded
SuE	Suffield silt loam, 25 to 45 percent slopes
SvA	Suffield very fine sandy loam, 0 to 2 percent slopes
SvB	Suffield very fine sandy loam, 2 to 8 percent slopes
SvC	Suffield very fine sandy loam, 8 to 15 percent slopes
SvD	Suffield very fine sandy loam, 15 to 25 percent slopes
ThB	Thorndike shaly silt loam, 2 to 8 percent slopes
ThC	Thorndike shaly silt loam, 8 to 15 percent slopes
ThD	Thorndike shaly silt loam, 15 to 25 percent slopes
ThE	Thorndike shaly silt loam, 25 to 45 percent slopes
TkB	Thorndike very rocky silt loam, 2 to 8 percent slopes
TkC	Thorndike very rocky silt loam, 8 to 15 percent slopes
TvB	Thorndike very stony silt loam, 2 to 8 percent slopes
TvC	Thorndike very stony silt loam, 8 to 15 percent slopes
TvD	Thorndike very stony silt loam, 15 to 35 percent slopes
Wn	Winooski silt loam

Soil map constructed 1962 by Cartographic Division, Soil Conservation Service, USDA, from 1942, 1947 and 1960 aerial photographs. Controlled mosaic based on Maine plane coordinate system, east zone, transverse Mercator projection. 1927 North American datum.

CONVENTIONAL SIGNS

WORKS AND STRUCTURES

Highways and roads
- Dual
- Good motor
- Poor motor
- Trail

Highway markers
- National Interstate
- U. S.
- State

Railroads
- Single track
- Multiple track
- Abandoned

Bridges and crossings
- Road
- Trail, foot
- Railroad
- Ferries
- Ford
- Grade
- R. R. over
- R. R. under
- Tunnel

Buildings
School
Church
Station
Borrow pit — B. P.
Mine dump
Pits, gravel or other
Power lines
Pipe lines
Cemeteries
Dams
Levees
Tanks
Forest fire or lookout station
Sawmill

BOUNDARIES

- National or state
- County
- Township, U. S.
- Section line, corner
- Reservation
- Land grant
- Township, civil

DRAINAGE

Streams
- Perennial
- Intermittent, unclass.

Canals and ditches — CANAL, DITCH

Lakes and ponds
- Perennial
- Intermittent

Wells — flowing
Springs
Marsh
Wet spot

RELIEF

Escarpments
- Bedrock
- Other

Prominent peaks

Depressions — Large, Small
- Crossable with tillage implements
- Not crossable with tillage implements
- Contains water most of the time

SOIL SURVEY DATA

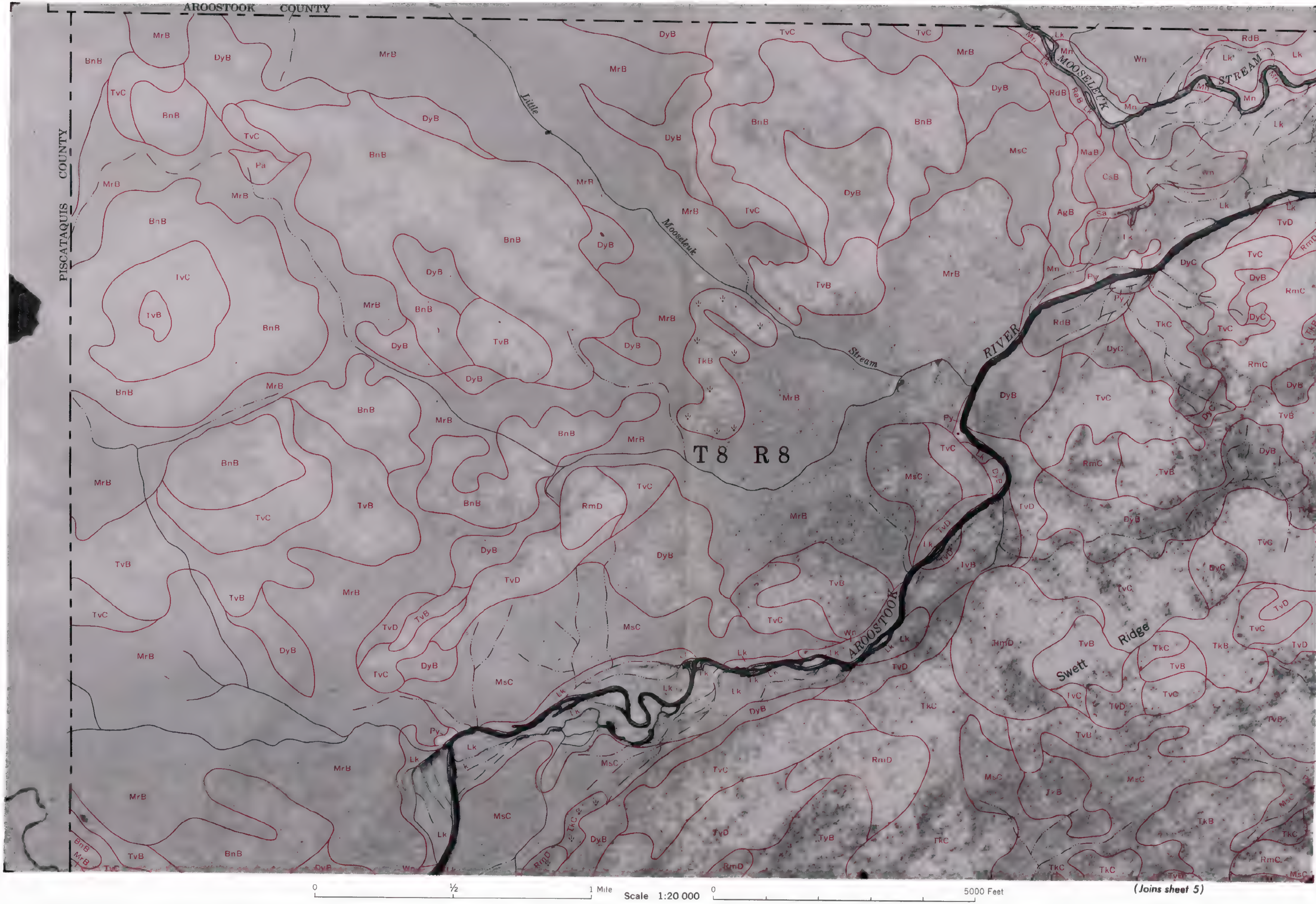
- Soil boundary and symbol — Dx
- Gravel
- Stones, very stony
- Rock outcrops
- Chert fragments
- Clay spot
- Sand spot
- Gumbo or scabby spot
- Made land
- Severely eroded spot
- Blowout, wind erosion
- Gullies

GUIDE TO MAPPING UNITS AND CAPABILITY UNITS

[See table 9, p. 55, for approximate acreage and proportionate extent of the soils; table 1, p. 18, for estimated average yields for cultivated soils under two levels of management; table 6, p. 46, and list, p. 48, for woodland suitability groups of soils; and table 7, p. 50, for rating of soils for wildlife habitats]

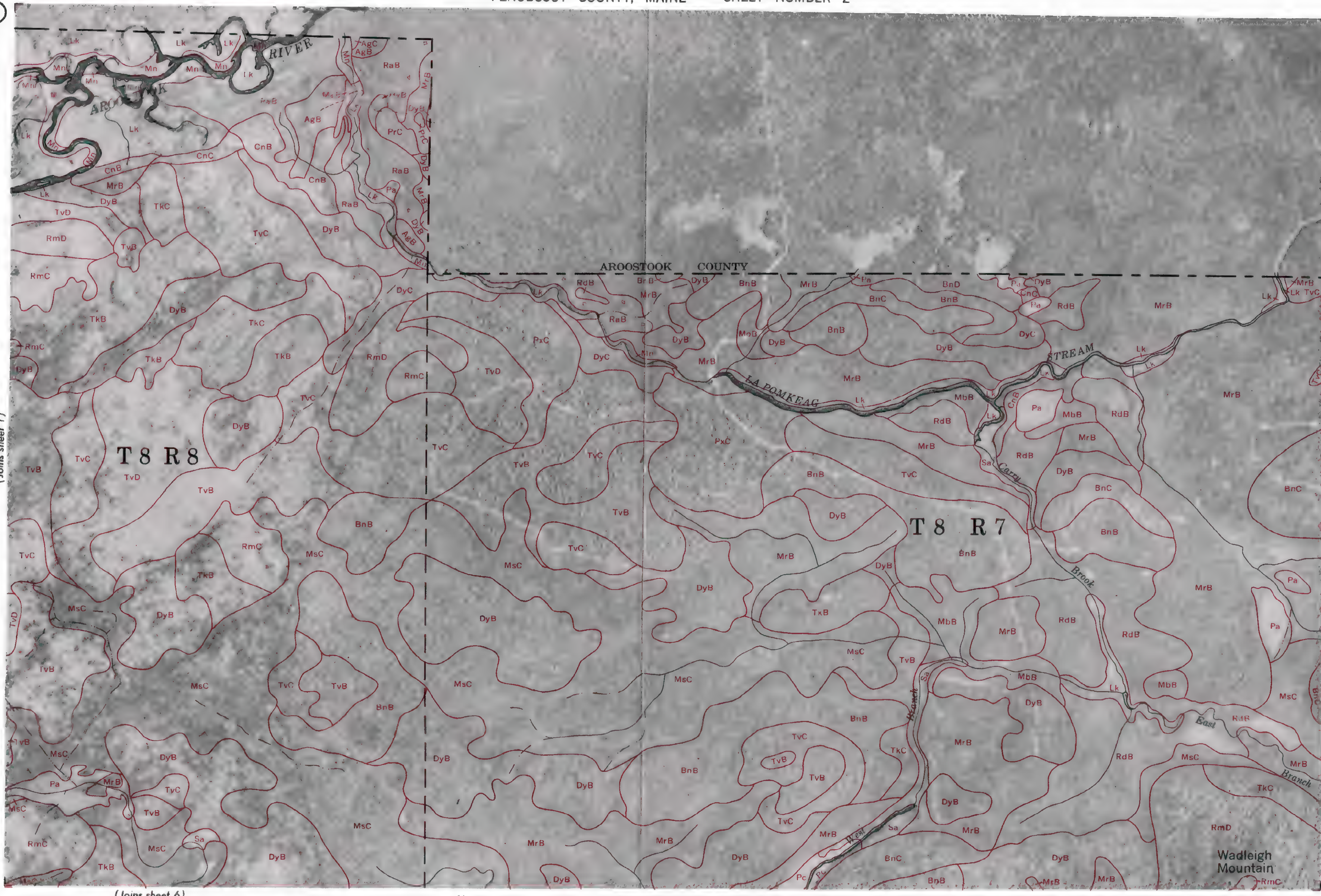
Map symbol	Mapping unit	Page	Capability unit: Symbol	Capability unit: Page
AaB	Adams loamy sand, 0 to 8 percent slopes	57	IIIs-5	12
AaC	Adams loamy sand, 8 to 15 percent slopes	57	IVs-5	13
AaE	Adams loamy sand, 15 to 45 percent slopes	57	VIIs-5	15
AgA	Allagash fine sandy loam, 0 to 2 percent slopes	58	I-5	8
AgB	Allagash fine sandy loam, 2 to 8 percent slopes	58	IIe-5	9
AgC	Allagash fine sandy loam, 8 to 15 percent slopes	58	IIIe-5	11
AgD	Allagash fine sandy loam, 15 to 25 percent slopes	59	IVe-5	12
BaA	Bangor silt loam, 0 to 2 percent slopes	60	I-3	8
BaB	Bangor silt loam, 2 to 8 percent slopes	60	IIe-3	9
BaC	Bangor silt loam, 8 to 15 percent slopes	60	IIIe-3	11
BaD	Bangor silt loam, 15 to 25 percent slopes	60	IVe-3	12
BmB	Bangor silt loam, moderately deep, 2 to 8 percent slopes	60	IIe-3	9
BmC	Bangor silt loam, moderately deep, 8 to 15 percent slopes	61	IIIe-3	11
BmD	Bangor silt loam, moderately deep, 15 to 35 percent slopes	61	IVe-3	12
BnB	Bangor very stony silt loam, 0 to 8 percent slopes	61	VIs-3	14
BnC	Bangor very stony silt loam, 8 to 15 percent slopes	62	VIs-3	14
BnD	Bangor very stony silt loam, 15 to 25 percent slopes	62	VIs-3	14
BoA	Biddeford silt loam, 0 to 3 percent slopes	63	VIw-7	14
BrA	Burnham silt loam, 0 to 3 percent slopes	64	Vw-3	13
BuA	Buxton silt loam, 0 to 2 percent slopes	64	IIw-7	10
BuB	Buxton silt loam, 2 to 8 percent slopes	64	IIw-7	10
BuC	Buxton silt loam, 8 to 15 percent slopes	65	IIIew-7	11
BxB	Buxton, Scantic, and Biddeford stony silt loams, 0 to 8 percent slopes	65	VIIsw-3	16
CaC	Canaan extremely rocky sandy loam, 5 to 15 percent slopes	65	VIIs-1	15
CaE	Canaan extremely rocky sandy loam, 15 to 45 percent slopes	66	VIIs-1	15
CcB	Colton cobbly sandy loam, dark materials, 0 to 8 percent slopes	67	IIIs-5	12
CcC	Colton cobbly sandy loam, dark materials, 8 to 15 percent slopes	67	IVs-5	13
CcD	Colton cobbly sandy loam, dark materials, 15 to 25 percent slopes	67	VIIs-5	15
CcE	Colton cobbly sandy loam, dark materials, 25 to 45 percent slopes	67	VIIs-5	15
CnA	Colton gravelly sandy loam, dark materials, 0 to 2 percent slopes	67	IIs-5	10
CnB	Colton gravelly sandy loam, dark materials, 2 to 8 percent slopes	68	IIs-5	10
CnC	Colton gravelly sandy loam, dark materials, 8 to 15 percent slopes	68	IIIes-5	12
CnD	Colton gravelly sandy loam, dark materials, 15 to 25 percent slopes	68	IVes-5	13
CnE	Colton gravelly sandy loam, dark materials, 25 to 45 percent slopes	69	VIIes-5	15
CsA	Colton loamy fine sand, dark materials, 0 to 2 percent slopes	69	IIIs-5	12
CsB	Colton loamy fine sand, dark materials, 2 to 8 percent slopes	69	IIIs-5	12
CsC	Colton loamy fine sand, dark materials, 8 to 15 percent slopes	69	IVs-5	13
CsD	Colton loamy fine sand, dark materials, 15 to 25 percent slopes	69	VIIs-5	15
DaA	Daigle silt loam, 0 to 2 percent slopes	70	IIw-4	9
DaB	Daigle silt loam, 2 to 8 percent slopes	70	IIw-4	9
DaC	Daigle silt loam, 8 to 15 percent slopes	70	IIIew-4	11
DgA	Daigle stony silt loam, 0 to 2 percent slopes	71	IVes-4	13
DgB	Daigle stony silt loam, 2 to 8 percent slopes	71	IVes-4	13
DgC	Daigle stony silt loam, 8 to 15 percent slopes	71	IVes-4	13
DxA	Dixmont silt loam, 0 to 2 percent slopes	72	IIw-4	9
DxB	Dixmont silt loam, 2 to 8 percent slopes	72	IIw-4	9
DxC	Dixmont silt loam, 8 to 15 percent slopes	72	IIIew-4	11
DyA	Dixmont very stony silt loam, 0 to 2 percent slopes	73	Vs-3	13
DyB	Dixmont very stony silt loam, 2 to 8 percent slopes	73	VIs-3	14
DyC	Dixmont very stony silt loam, 8 to 15 percent slopes	73	VIs-3	14
EwB	Elmwood fine sandy loam, 0 to 8 percent slopes	74	IIw-8	10
Ha	Hadley silt loam	74	I-6	8
HbB	Hermon sandy loam, 2 to 8 percent slopes	75	IIs-5	10
HbC	Hermon sandy loam, 8 to 15 percent slopes	75	IIIes-5	12
HdB	Hermon sandy loam, moderately deep, 2 to 8 percent slopes	75	IIs-5	10
HdC	Hermon sandy loam, moderately deep, 8 to 15 percent slopes	75	IIIes-5	12
HeB	Hermon very stony sandy loam, 2 to 8 percent slopes	75	VIs-3	14
HeC	Hermon very stony sandy loam, 8 to 15 percent slopes	76	VIs-3	14
HeE	Hermon very stony sandy loam, 15 to 45 percent slopes	76	VIIs-3	15
HhC	Hermon extremely stony sandy loam, 5 to 15 percent slopes	76	VIIs-3	15
HoB	Howland gravelly loam, 0 to 8 percent slopes	77	IIw-4	9
HoC	Howland gravelly loam, 8 to 15 percent slopes	77	IIIew-4	11
HvB	Howland very stony loam, 0 to 8 percent slopes	77	VIs-3	14
HvC	Howland very stony loam, 8 to 15 percent slopes	77	VIs-3	14
HvD	Howland very stony loam, 15 to 25 percent slopes	77	VIs-3	14
Lk	Limerick silt loam	78	VIw-6	14
MaB	Machias fine sandy loam, 0 to 8 percent slopes	79	IIw-5	10

Map symbol	Mapping unit	Page	Capability unit: Symbol	Capability unit: Page
MbB	Madawaska very fine sandy loam, 0 to 8 percent slopes	79	IIw-5	10
Md	Made land	79	------	------
MeA	Melrose fine sandy loam, 0 to 2 percent slopes	80	I-5	8
MeB	Melrose fine sandy loam, 2 to 8 percent slopes	80	IIe-5	9
MeC	Melrose fine sandy loam, 8 to 15 percent slopes	80	IIIe-5	11
Mn	Mixed alluvial land	80	VIw-6	14
MoB	Monarda silt loam, 0 to 8 percent slopes	81	IIIw-3	12
MrB	Monarda and Burnham very stony silt loams, 0 to 8 percent slopes	82	VIIsw-3	16
MsC	Monarda and Burnham extremely stony silt loams, 0 to 15 percent slopes	82	VIIsw-3	16
Mu	Muck	82	VIIw-9	15
On	Ondawa fine sandy loam	83	I-6	8
Pa	Peat and muck	84	VIIw-9	15
Pc	Peat, coarsely fibrous	83	VIIw-9	15
Pf	Peat, moderately fibrous	84	VIIw-9	15
PgB	Plaisted gravelly loam, 2 to 8 percent slopes	87	IIe-3	9
PgC	Plaisted gravelly loam, 8 to 15 percent slopes	87	IIIe-3	11
PgD	Plaisted gravelly loam, 15 to 25 percent slopes	87	IVe-3	12
PgE	Plaisted gravelly loam, 25 to 45 percent slopes	87	VIe-3	14
PhB	Perham silt loam, 0 to 8 percent slopes	86	IIe-3	9
PhC	Perham silt loam, 8 to 15 percent slopes	86	IIIe-3	11
PmB	Perham stony silt loam, 0 to 8 percent slopes	86	IVes-4	13
PmC	Perham stony silt loam, 8 to 15 percent slopes	86	IVes-4	13
PrC	Plaisted very stony loam, 5 to 15 percent slopes	88	VIs-3	14
PrE	Plaisted very stony loam, 15 to 45 percent slopes	88	VIIs-3	15
Ps	Peat, sphagnum	85	VIIIw-9	16
PxC	Plaisted extremely stony loam, 5 to 15 percent slopes	88	VIIs-3	15
Py	Podunk fine sandy loam	89	IIw-6	10
RaB	Red Hook and Atherton silt loams, 0 to 8 percent slopes	90	IIIw-5	12
RdB	Red Hook and Atherton fine sandy loams, 0 to 8 percent slopes	90	IIIw-5	12
Re	Riverwash	90	VIIIw-6	16
RkC	Rockland, Canaan material, sloping	90	VIIs-1	15
RkD	Rockland, Canaan material, strongly sloping	91	VIIs-1	15
RmC	Rockland, Thorndike material, sloping	91	VIIs-1	15
RmD	Rockland, Thorndike material, strongly sloping	91	VIIs-1	15
Ro	Rock outcrop	91	VIIIs-1	16
Sa	Saco silt loam	92	VIIw-6	15
ScB	Scantic silt loam, 0 to 8 percent slopes	92	IVw-7	13
SeA	Stetson fine sandy loam, 0 to 2 percent slopes	93	I-5	8
SeB	Stetson fine sandy loam, 2 to 8 percent slopes	93	IIe-5	9
SeC	Stetson fine sandy loam, 8 to 15 percent slopes	94	IIIe-5	11
SeD	Stetson fine sandy loam, 15 to 25 percent slopes	94	IVe-5	12
SfC	Stetson-Suffield complex, 0 to 15 percent slopes	94	IIIe-5	11
SfE	Stetson-Suffield complex, 15 to 45 percent slopes	94	VIe-5	14
ShD	Stony land, Hermon material, strongly sloping	94	VIIs-3	15
SpD	Stony land, Plaisted material, strongly sloping	95	VIIs-3	15
SuA	Suffield silt loam, 0 to 2 percent slopes	95	IIe-7	9
SuB	Suffield silt loam, 2 to 8 percent slopes	95	IIe-7	9
SuC	Suffield silt loam, 8 to 15 percent slopes	96	IIIe-7	11
SuC2	Suffield silt loam, 8 to 15 percent slopes, eroded	96	IVe-7	13
SuD	Suffield silt loam, 15 to 25 percent slopes	96	IVe-7	13
SuD2	Suffield silt loam, 15 to 25 percent slopes, eroded	96	VIe-7	14
SuE	Suffield silt loam, 25 to 45 percent slopes	97	VIe-7	14
SvA	Suffield very fine sandy loam, 0 to 2 percent slopes	97	IIe-7	9
SvB	Suffield very fine sandy loam, 2 to 8 percent slopes	97	IIe-7	9
SvC	Suffield very fine sandy loam, 8 to 15 percent slopes	97	IIIe-7	11
SvD	Suffield very fine sandy loam, 15 to 25 percent slopes	97	IVe-7	13
ThB	Thorndike shaly silt loam, 2 to 8 percent slopes	98	IIe-1	9
ThC	Thorndike shaly silt loam, 8 to 15 percent slopes	98	IIIe-1	10
ThD	Thorndike shaly silt loam, 15 to 25 percent slopes	98	IVe-1	12
ThE	Thorndike shaly silt loam, 25 to 45 percent slopes	99	VIe-1	14
TkB	Thorndike very rocky silt loam, 2 to 8 percent slopes	99	VIs-1	14
TkC	Thorndike very rocky silt loam, 8 to 15 percent slopes	99	VIs-1	14
TvB	Thorndike very stony silt loam, 2 to 8 percent slopes	99	VIs-1	14
TvC	Thorndike very stony silt loam, 8 to 15 percent slopes	99	VIs-1	14
TvD	Thorndike very stony silt loam, 15 to 35 percent slopes	99	VIs-1	14
Wn	Winooski silt loam	100	IIw-6	10



This map is one of a set compiled in 1962, as part of a soil survey by the Soil Conservation Service, United States Department of Agriculture, and the Maine Agricultural Experiment Station.

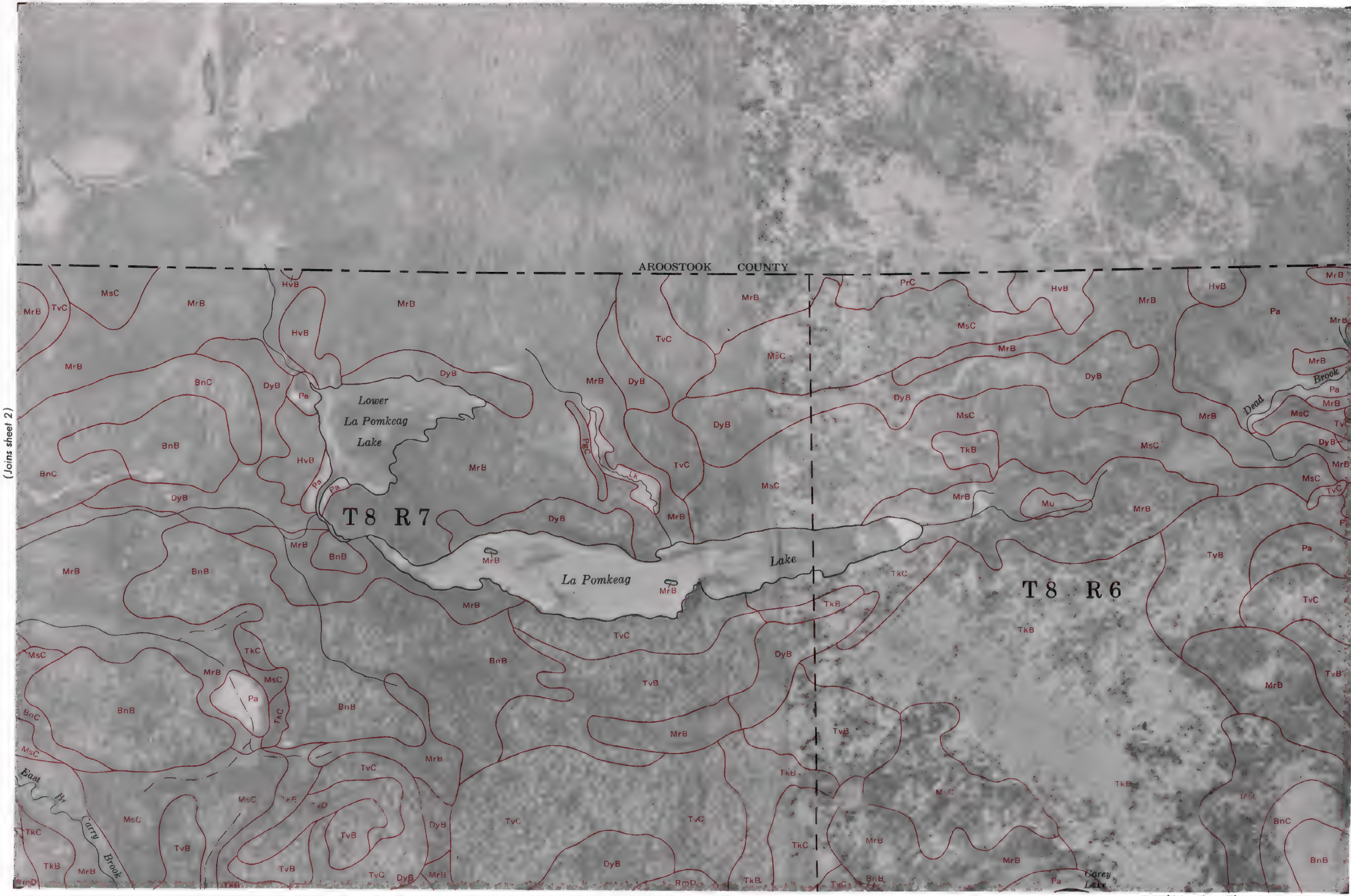
2



0 ½ 1 Mile Scale 1:20 000 0 5000 Feet

3

(Joins sheet 2)

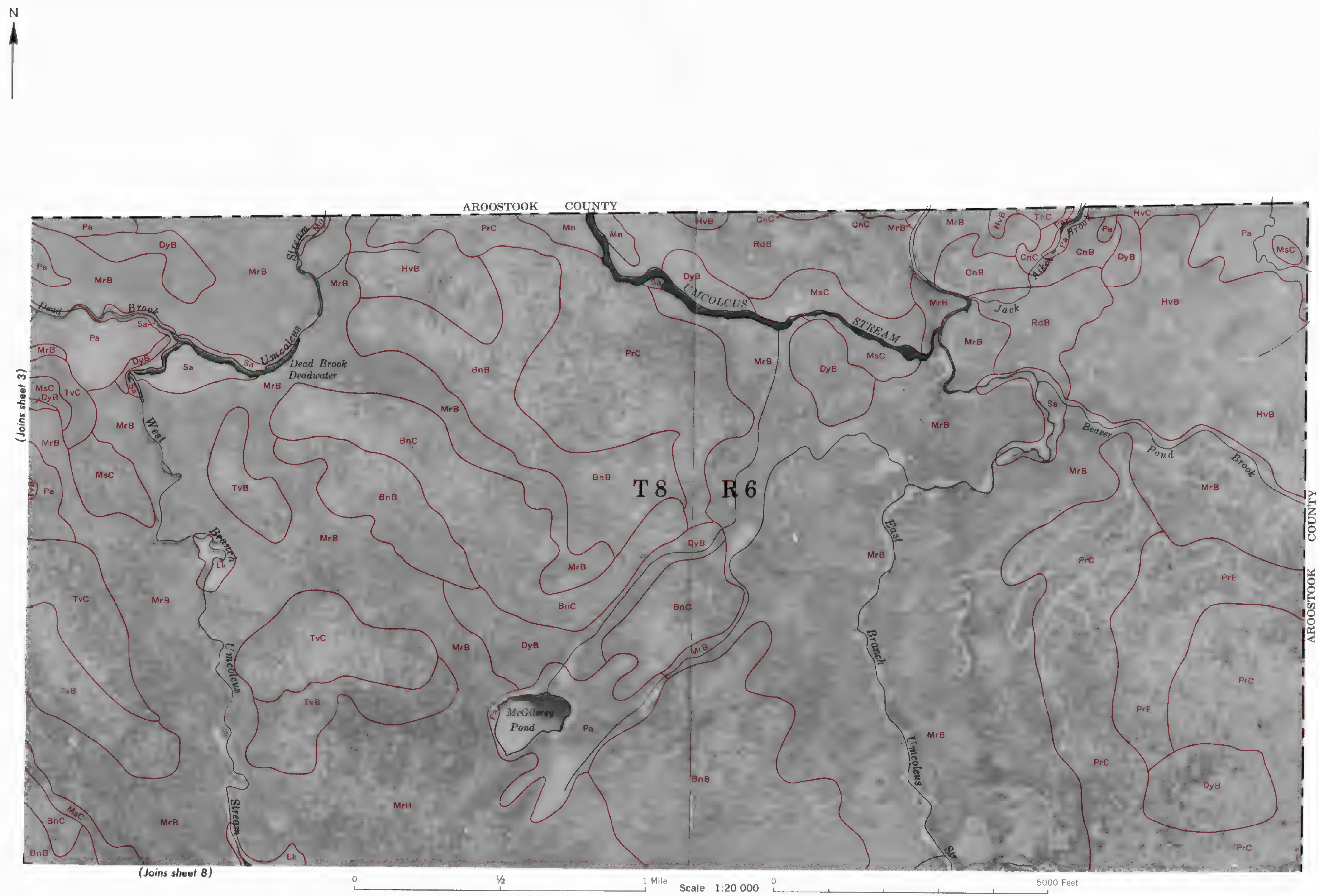


(Joins sheet 4)

(Joins sheet 7)

0 ½ 1 Mile Scale 1:20 000 0 5000 Feet

This map is one of a set compiled in 1962, as part of a soil survey by the Soil Conservation Service, United States Department of Agriculture, and the Maine Agricultural Experiment Station.


N
AROOSTOOK COUNTY
(Joins sheet 3)
(Joins sheet 8)
AROOSTOOK COUNTY
T 8 R 6
UMCOLCUS STREAM
Dead Brook
Dead Brook Deadwater
West Branch Umcolcus Stream
East Branch Umcolcus Stream
Jack Aiken Brook
Beaver Pond Brook
McGilvery Pond
0 ½ 1 Mile
Scale 1:20 000
0 5000 Feet

Scale 1:20 000

0 ½ 1 Mile

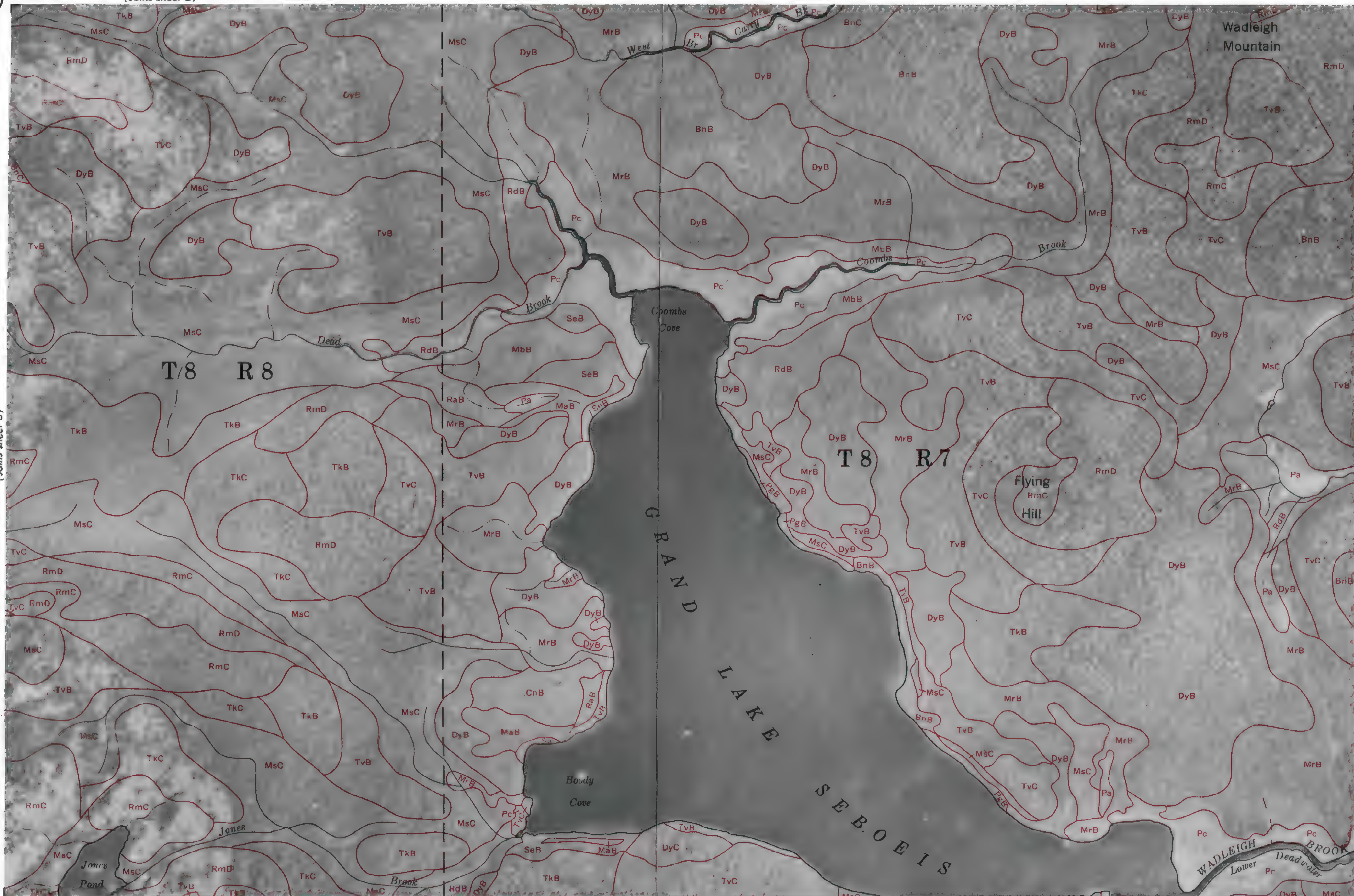
0 5000 Feet

This map is one of a set compiled in 1962, as part of a soil survey by the Soil Conservation Service, United States Department of Agriculture, and the Maine Agricultural Experiment Station.

6

(Joins sheet 2)

(Joins sheet 5)



(Joins sheet 7)

(Joins sheet 10)

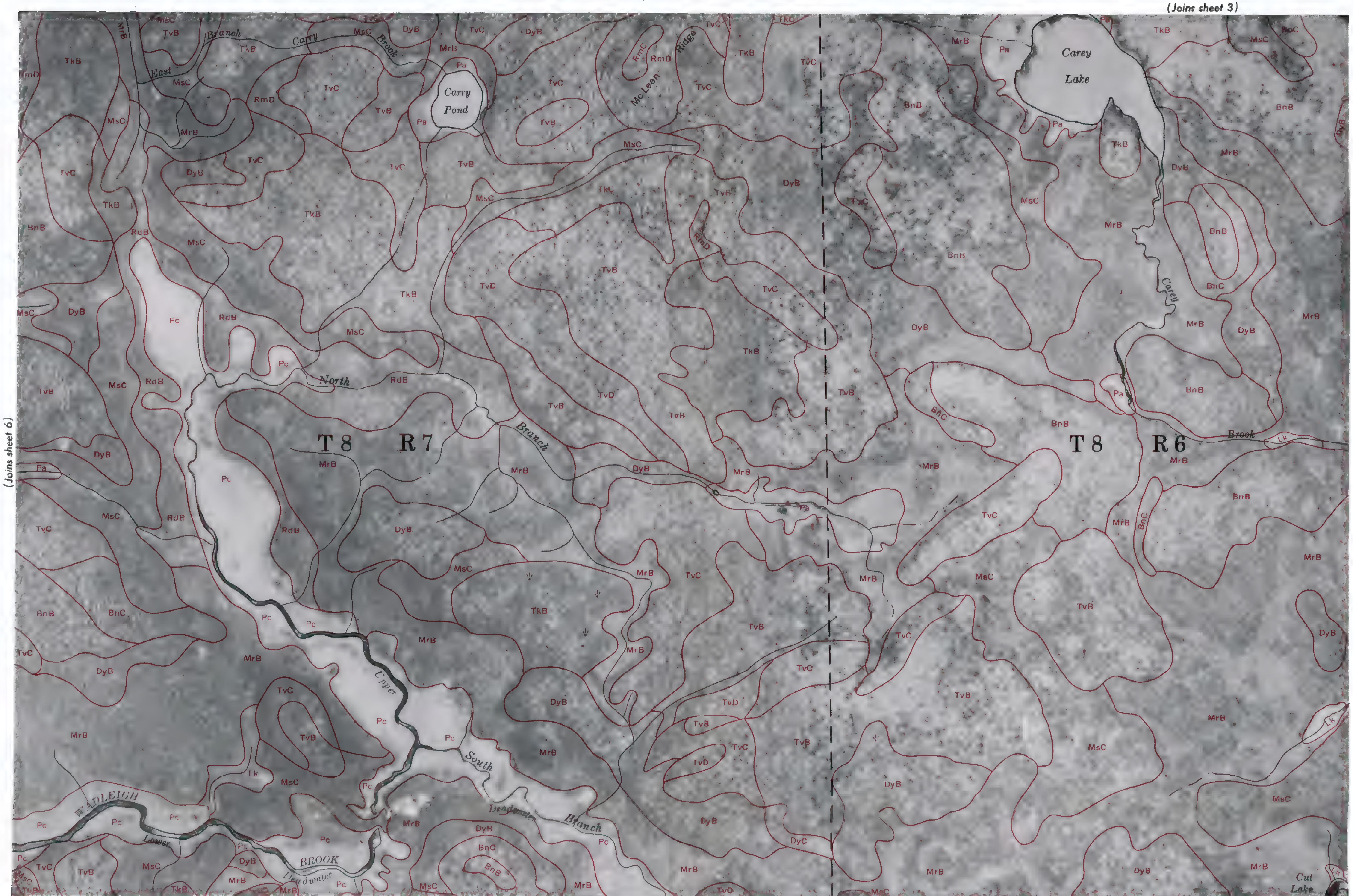
0 ½ 1 Mile Scale 1:20 000 0 5000 Feet

(Joins sheet 3)

7

This map is one of a set compiled in 1962, as part of a soil survey by the Soil Conservation Service, United States Department of Agriculture, and the Maine Agricultural Experiment Station.

(Joins sheet 6)



(Joins sheet 8)

(Joins sheet 11)

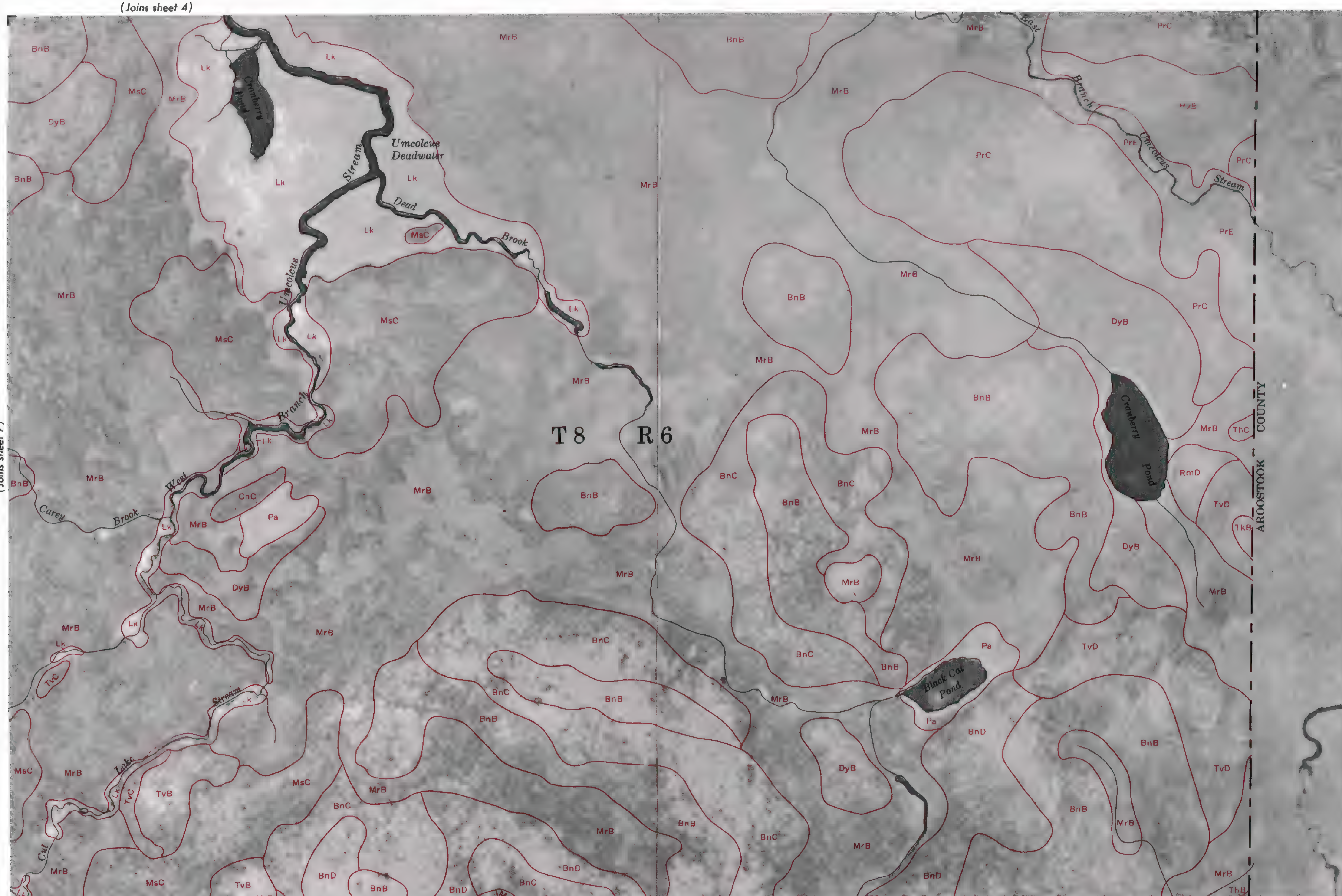
0 ½ 1 Mile Scale 1:20 000 0 5000 Feet

8

(Joins sheet 4)

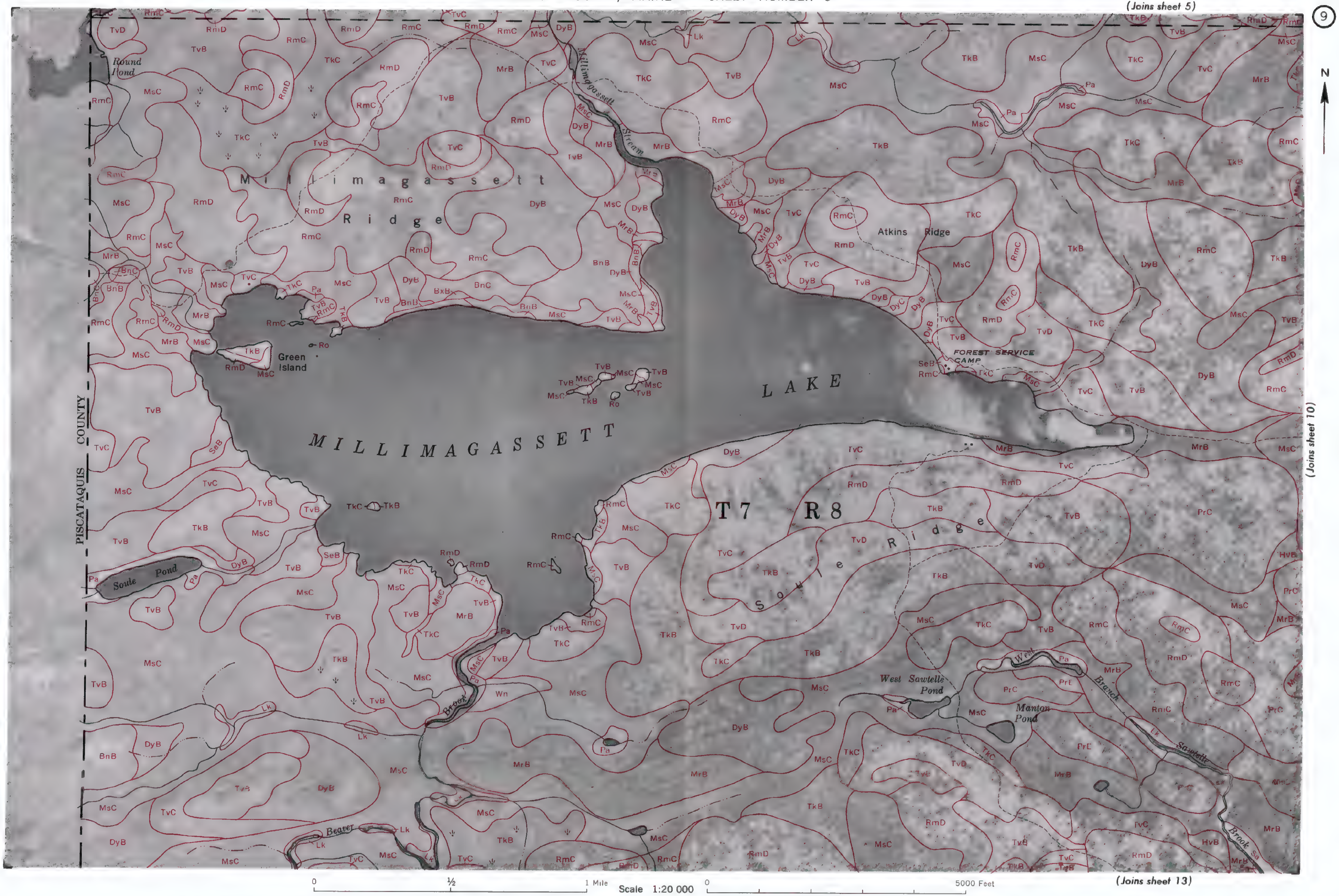
N

(Joins sheet 7)



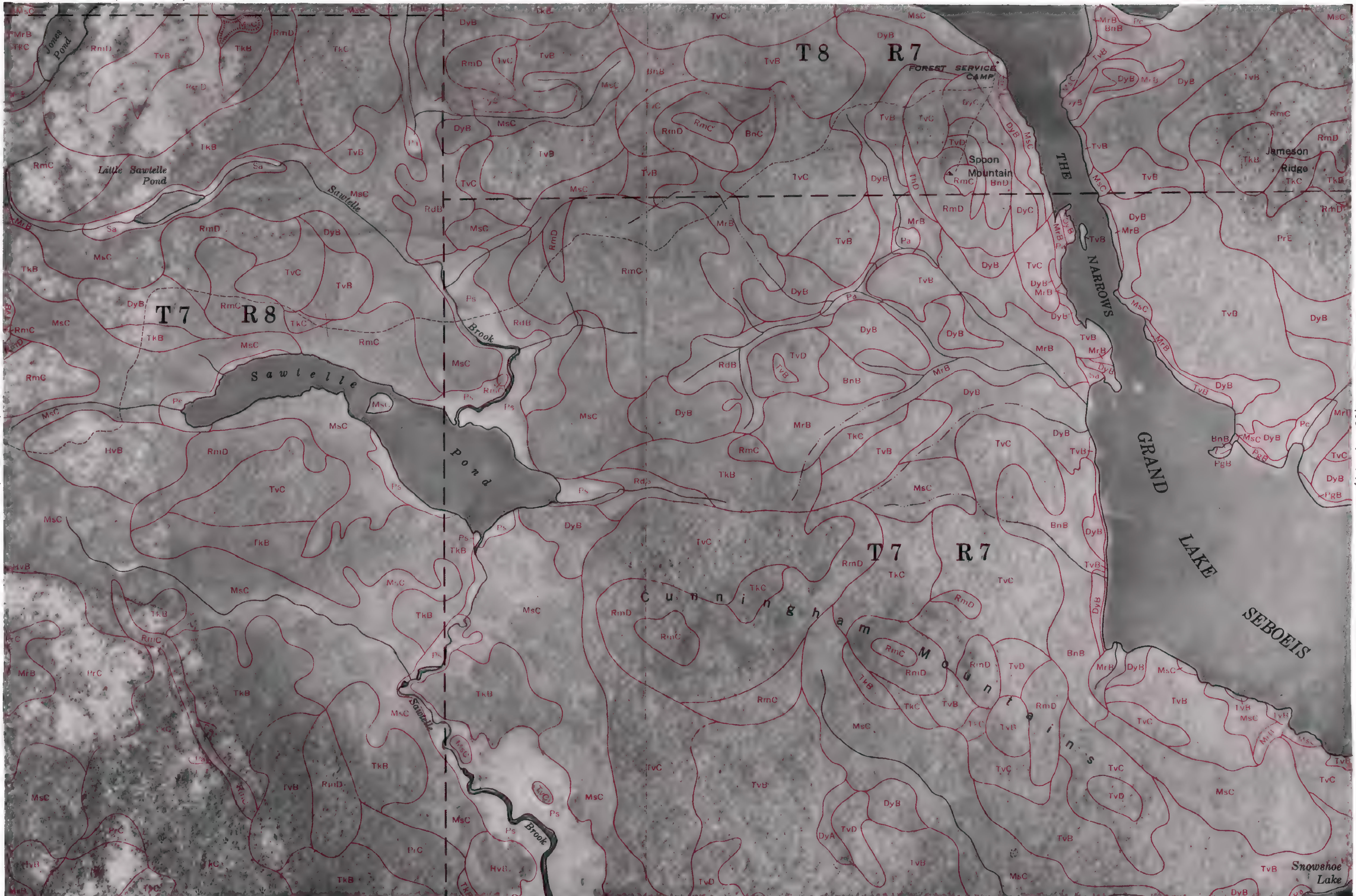
(Joins sheet 12)

0 ½ 1 Mile Scale 1:20 000 0 5000 Feet



This map is one of a set compiled in 1962, as part of a soil survey by the Soil Conservation Service, United States Department of Agriculture, and the Maine Agricultural Experiment Station.

(Joins sheet 6)



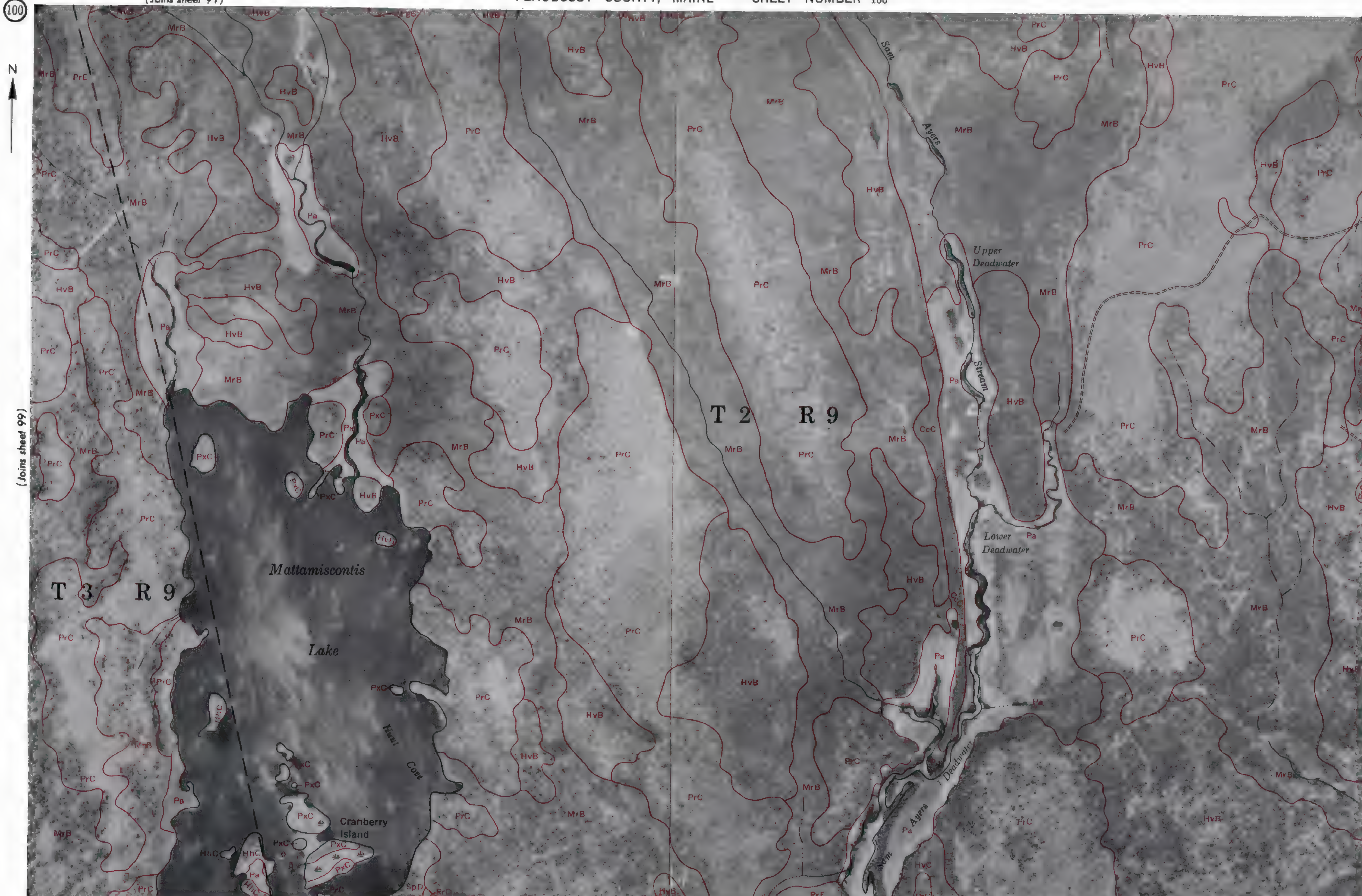
(Joins sheet 14)

Scale 1:20 000

0 ½ 1 Mile

0 5000 Feet

(Joins sheet 91)



(Joins sheet 109)

0 ½ 1 Mile
Scale 1:20 000
0 5000 Feet

(Joins sheet 92)

101

(Joins sheet 100)

(Joins sheet 102)

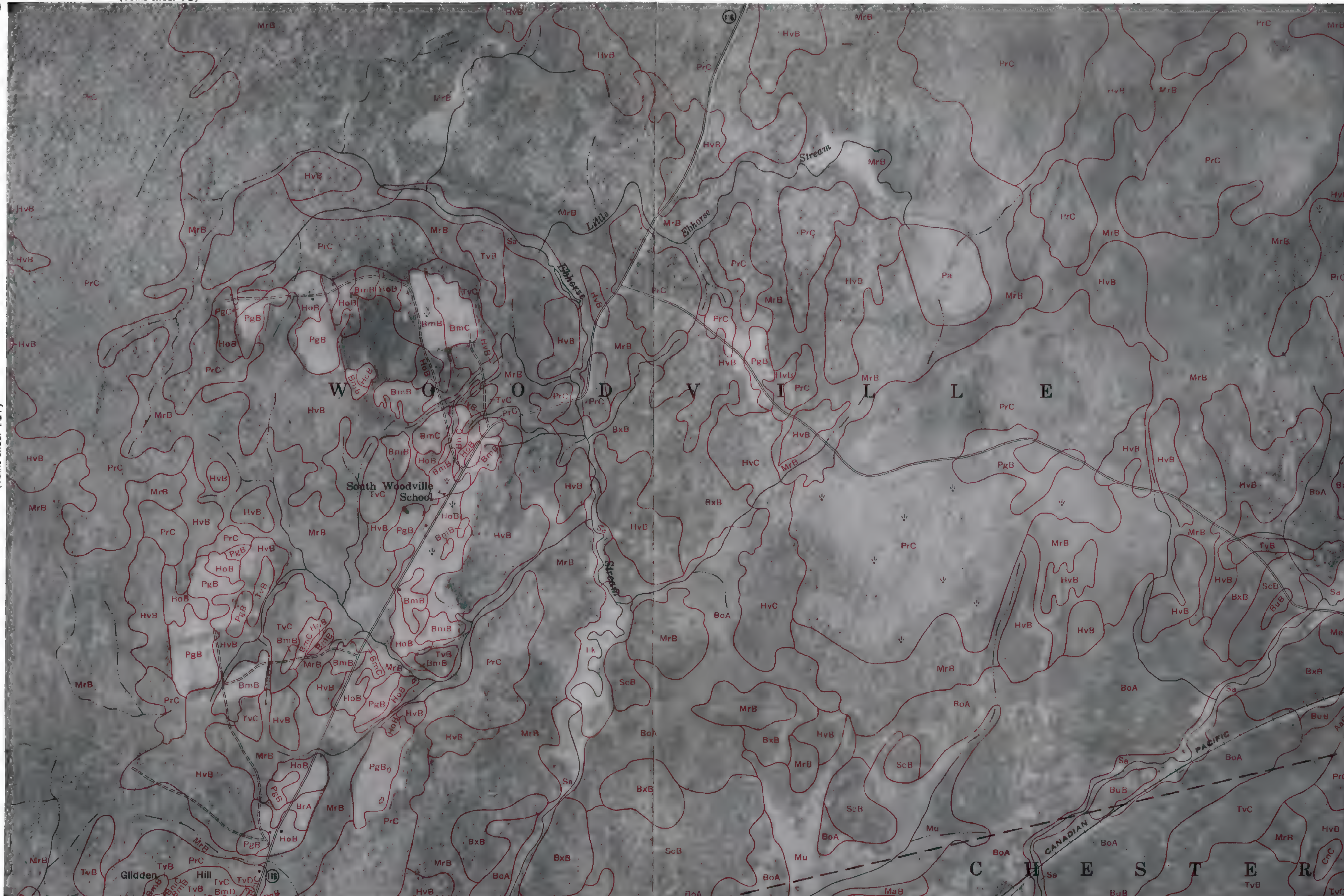
(Joins sheet 110)

Scale 1:20 000 — 0, ½, 1 Mile — 0, 5000 Feet

This map is one of a set compiled in 1962, as part of a soil survey by the Soil Conservation Service, United States Department of Agriculture, and the Maine Agricultural Experiment Station.

102

(Joins sheet 93)



(Joins sheet 101)

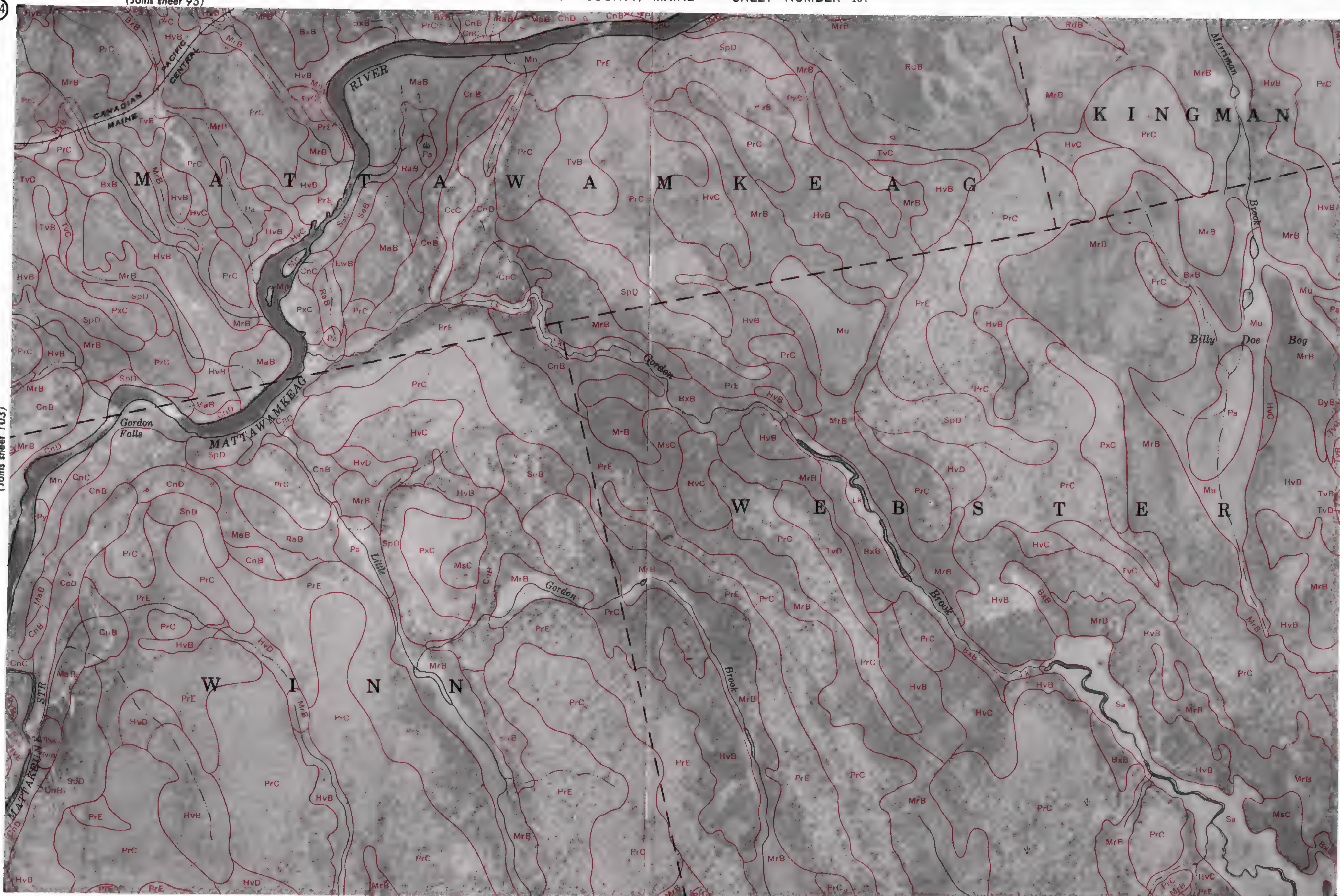
(Joins sheet 103)

(Joins sheet 111)

0 ½ 1 Mile Scale 1:20 000 0 5000 Feet

This map is one of a set compiled in 1962, as part of a soil survey by the Soil Conservation Service, United States Department of Agriculture, and the Maine Agricultural Experiment Station.

(Joins sheet 95)



(Joins sheet 103)

(Joins sheet 105)

(Joins sheet 113)

0 ½ 1 Mile

Scale 1:20 000

0 5000 Feet

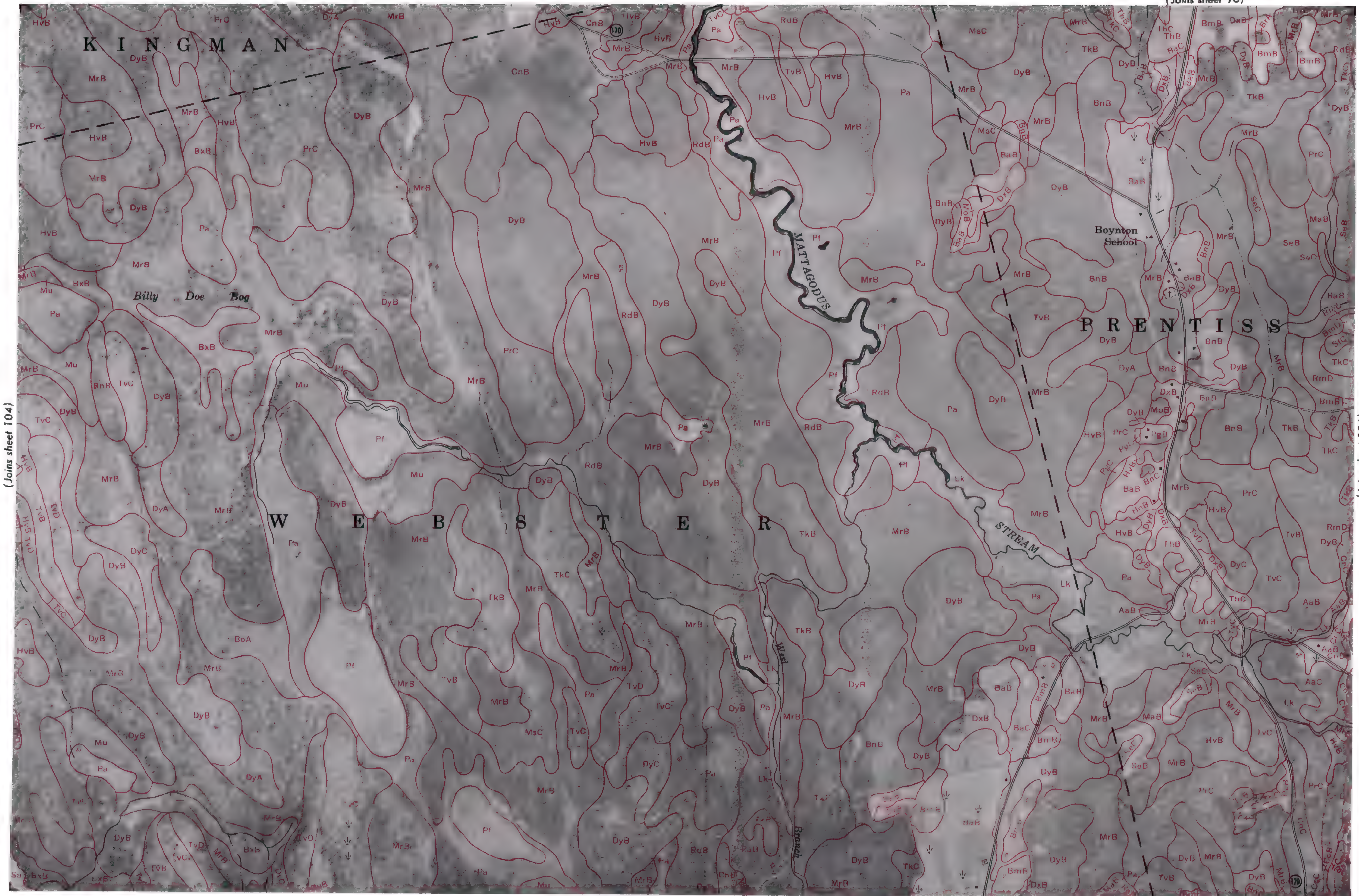
(Joins sheet 96)

105

N

This map is one of a set compiled in 1962, as part of a soil survey by the Soil Conservation Service, United States Department of Agriculture, and the Maine Agricultural Experiment Station.

(Joins sheet 104)



(Joins sheet 106)

(Joins sheet 114)

0 ½ 1 Mile Scale 1:20 000 0 5000 Feet

106

(Joins sheet 97)

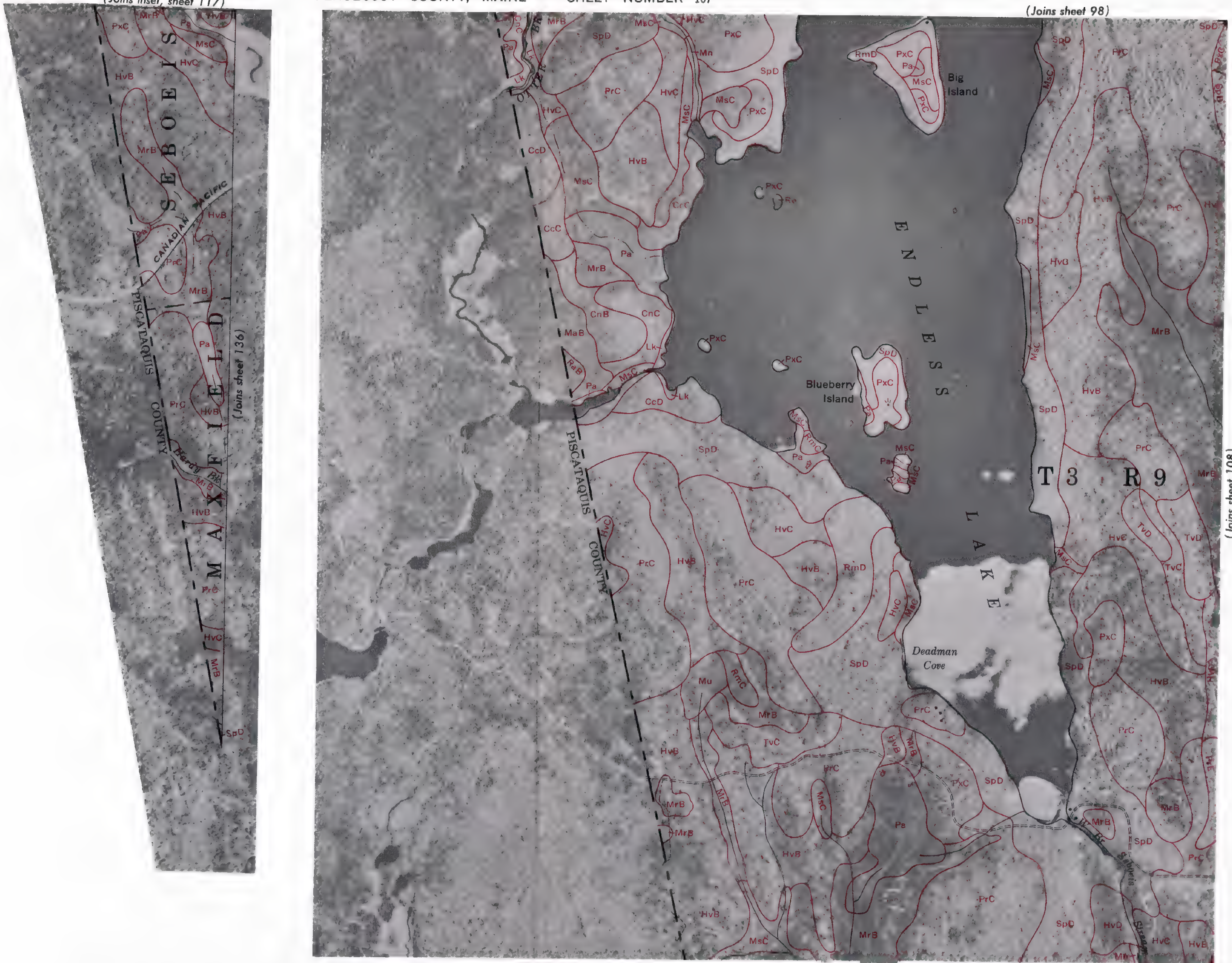
N

(Joins sheet 105)

(Joins inset, sheet 116)

(Joins sheet 115)

0 ½ 1 Mile Scale 1:20 000 0 5000 Feet



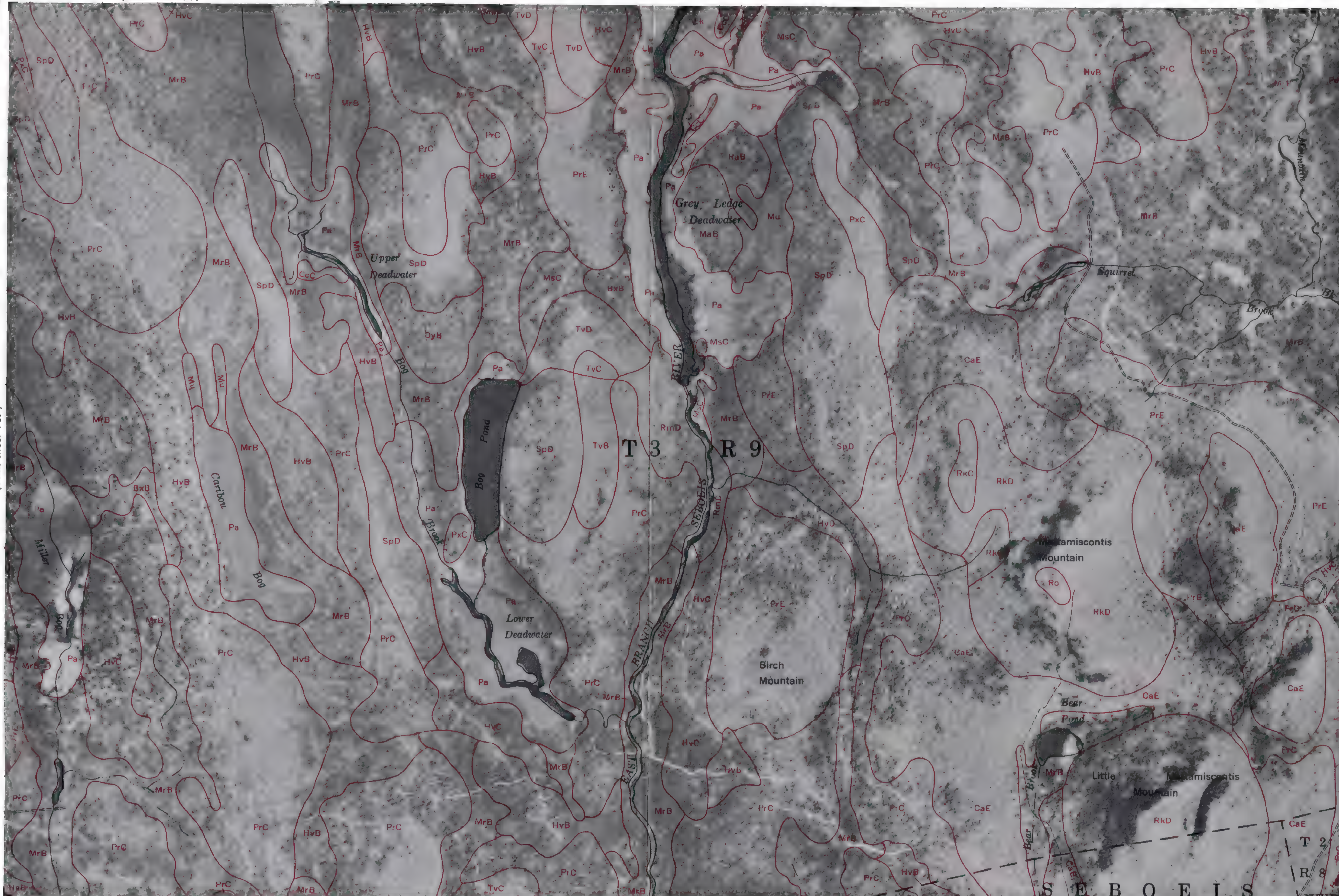
0 ½ 1 Mile Scale 1:20 000 0 5000 Feet

This map is one of a set compiled in 1962, as part of a soil survey by the Soil Conservation Service, United States Department of Agriculture, and the Maine Agricultural Experiment Station.

(Joins sheet 99)

PENOBSCOT COUNTY, MAINE — SHEET NUMBER 108

(Joins sheet 107)



(Joins sheet 109)

(Joins sheet 118)

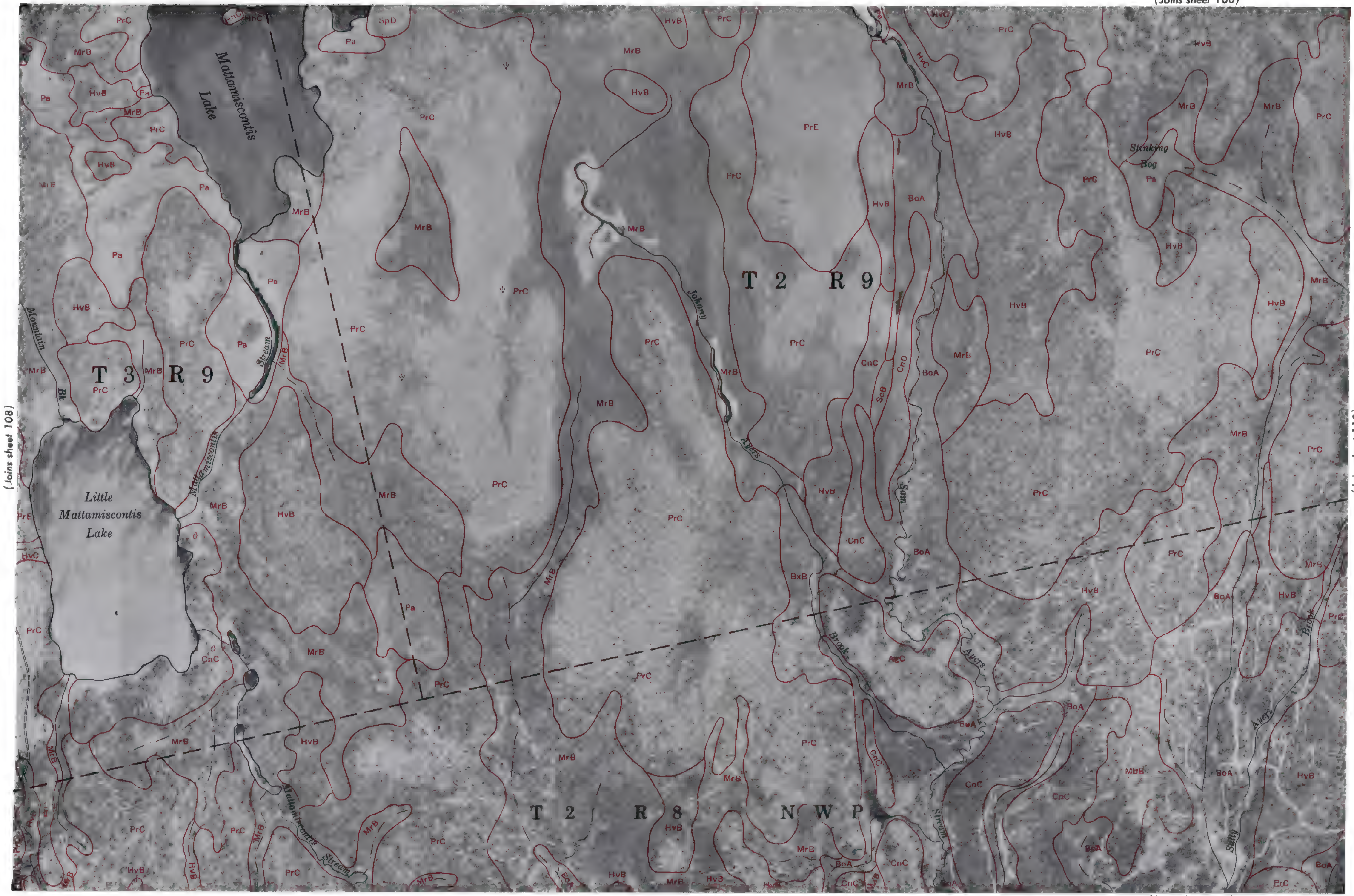
0 ½ 1 Mile Scale 1:20 000 0 5000 Feet

(Joins sheet 100)

109

N

(Joins sheet 108)

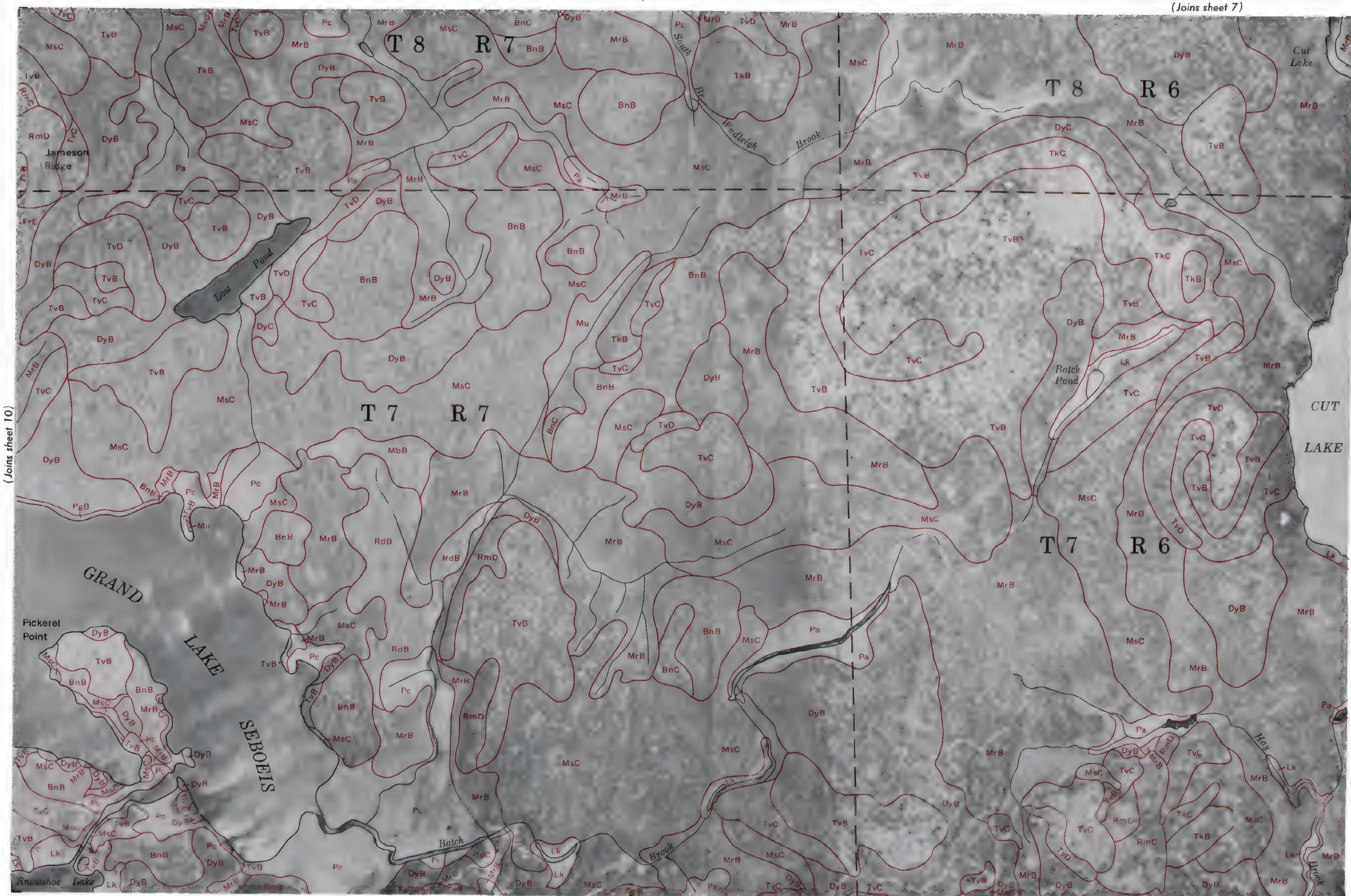


(Joins sheet 110)

(Joins sheet 119)

0 ½ 1 Mile Scale 1:20 000 0 5000 Feet

This map is one of a set compiled in 1962, as part of a soil survey by the Soil Conservation Service, United States Department of Agriculture, and the Maine Agricultural Experiment Station.



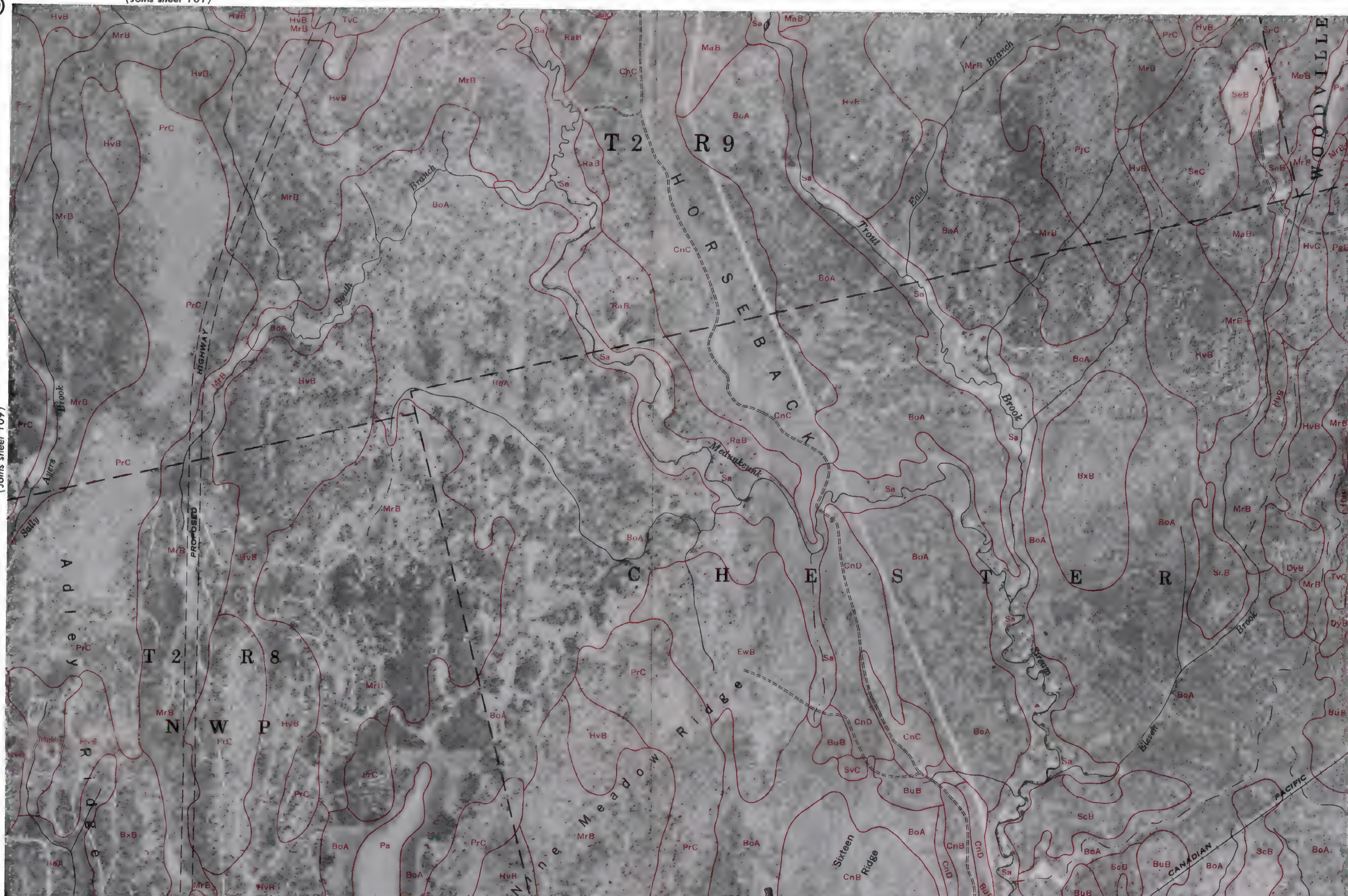
0 ½ 1 Mile Scale 1:20 000 0 5000 Feet

This map is one of a set compiled in 1962, as part of a soil survey by the Soil Conservation Service, United States Department of Agriculture, and the Maine Agricultural Experiment Station.

PENOBSCOT COUNTY, MAINE — SHEET NUMBER 110

(Joins sheet 101)

(Joins sheet 109)



(Joins sheet 111)

(Joins sheet 120)

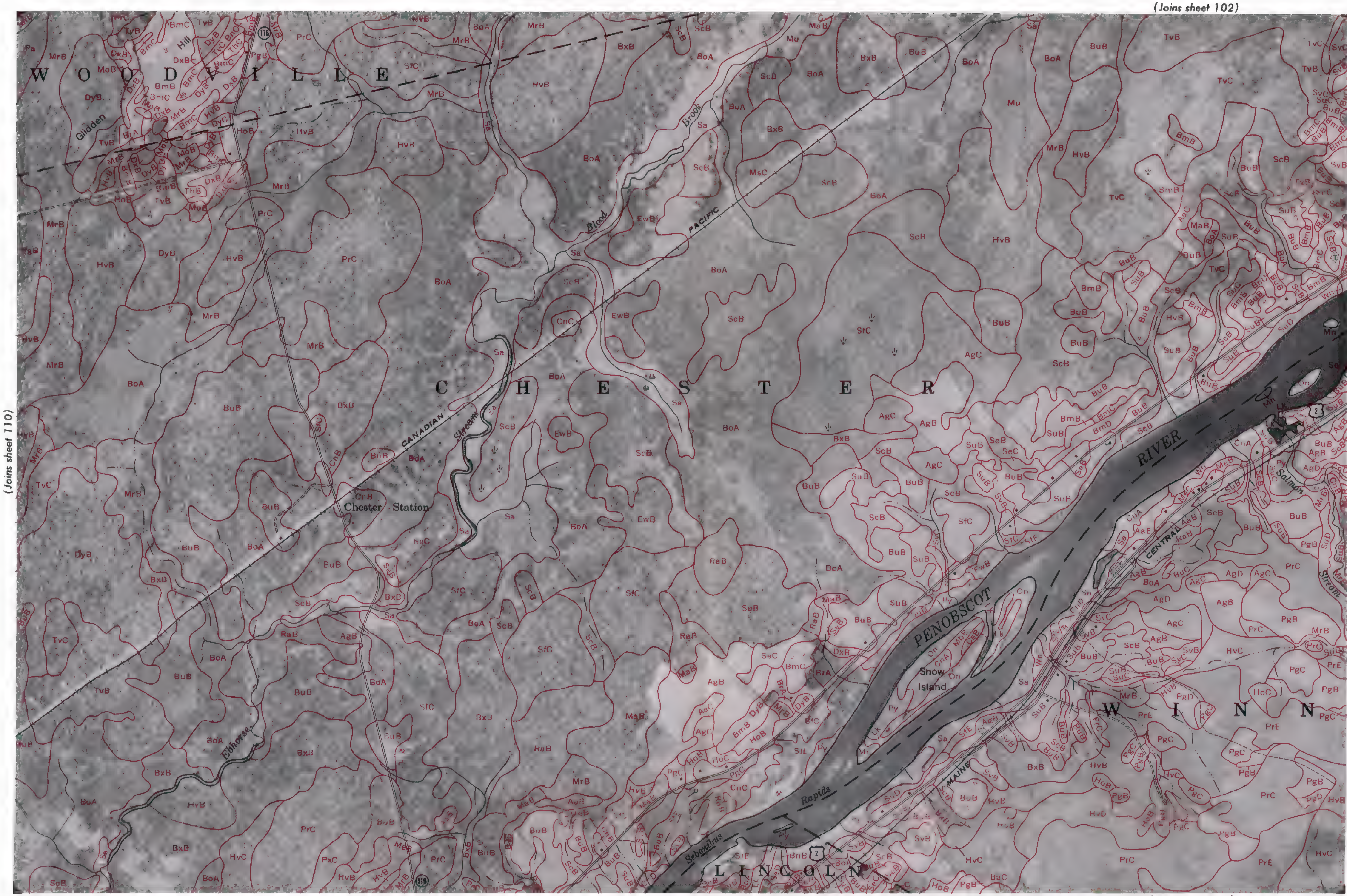
0 ½ 1 Mile Scale 1:20 000 0 5000 Feet

(Joins sheet 102)

111

This map is one of a set compiled in 1962, as part of a soil survey by the Soil Conservation Service, United States Department of Agriculture, and the Maine Agricultural Experiment Station.

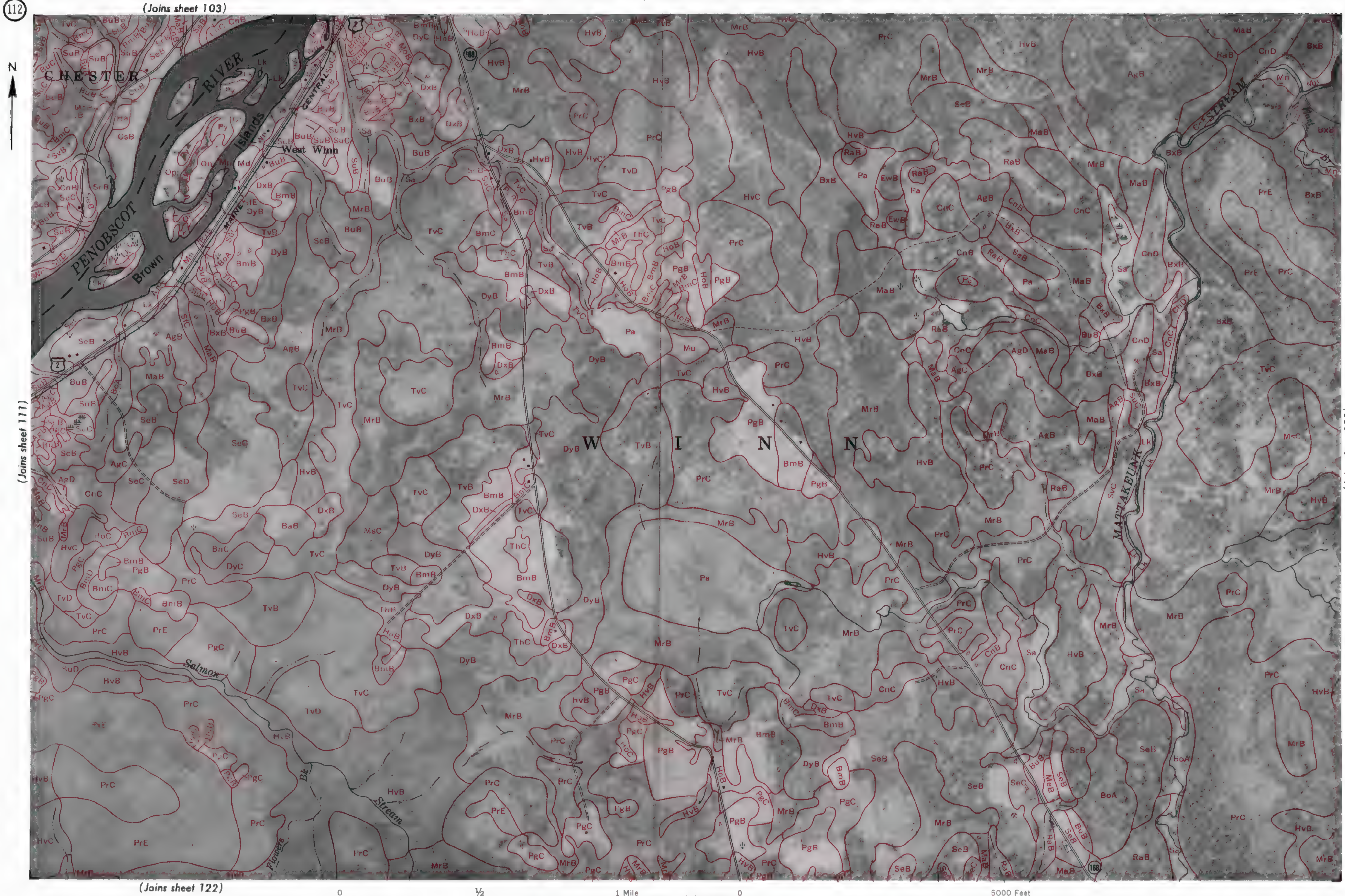
(Joins sheet 110)



(Joins sheet 112)

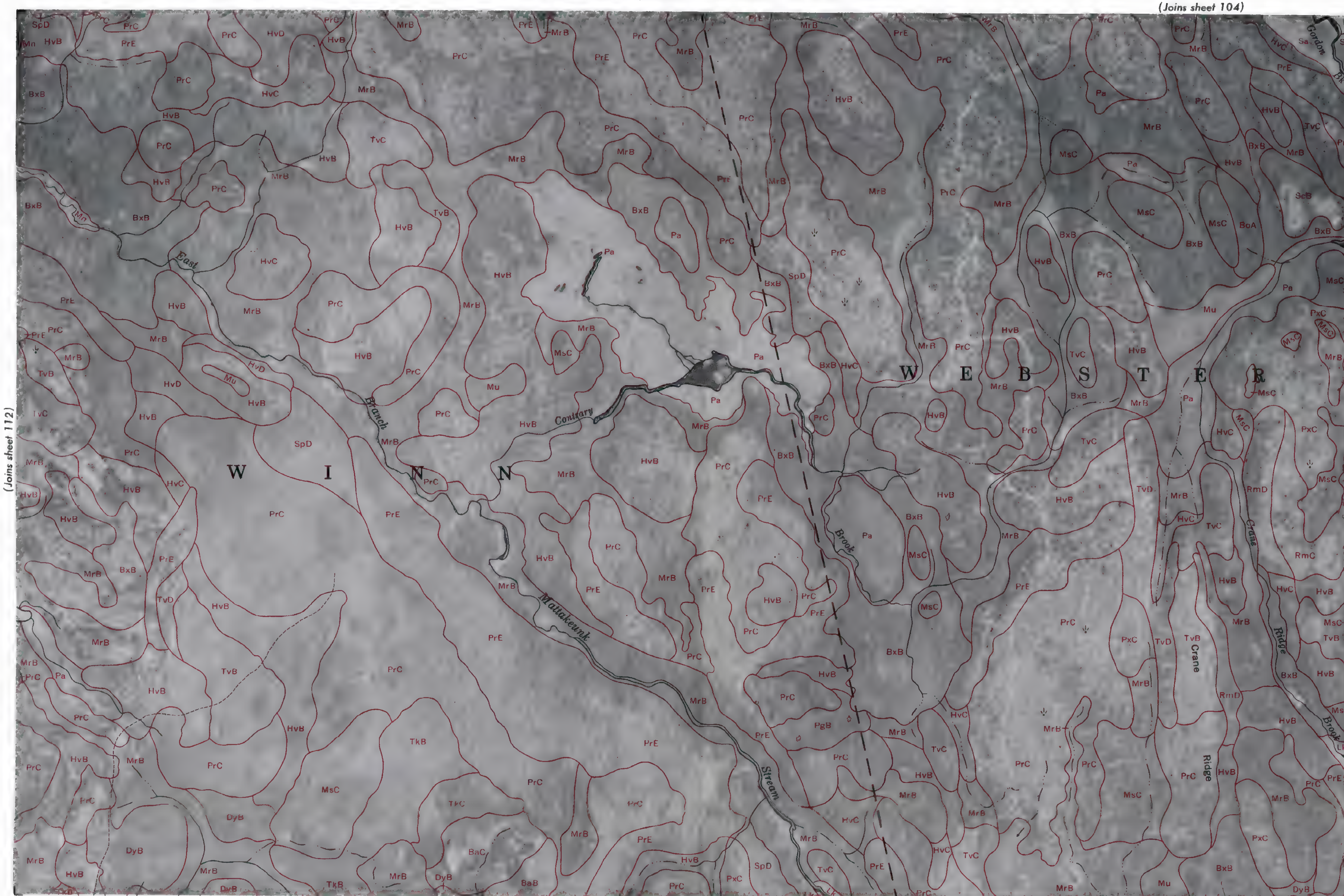
(Joins sheet 121)

0 ½ 1 Mile Scale 1:20 000 0 5000 Feet


112
(Joins sheet 103)
(Joins sheet 111)
(Joins sheet 113)
(Joins sheet 122)
N
CHESTER
PENOBSCOT
RIVER
Brown
Islands
West Winn
MAINE
CENTRAL
W I N N
MATTAKEUNK
STREAM
Salmon
Stream
Flowers
Bk
0
½
1 Mile
Scale 1:20 000
0
5000 Feet

(Joins sheet 104)

113



(Joins sheet 112)

(Joins sheet 114)

(Joins sheet 123)

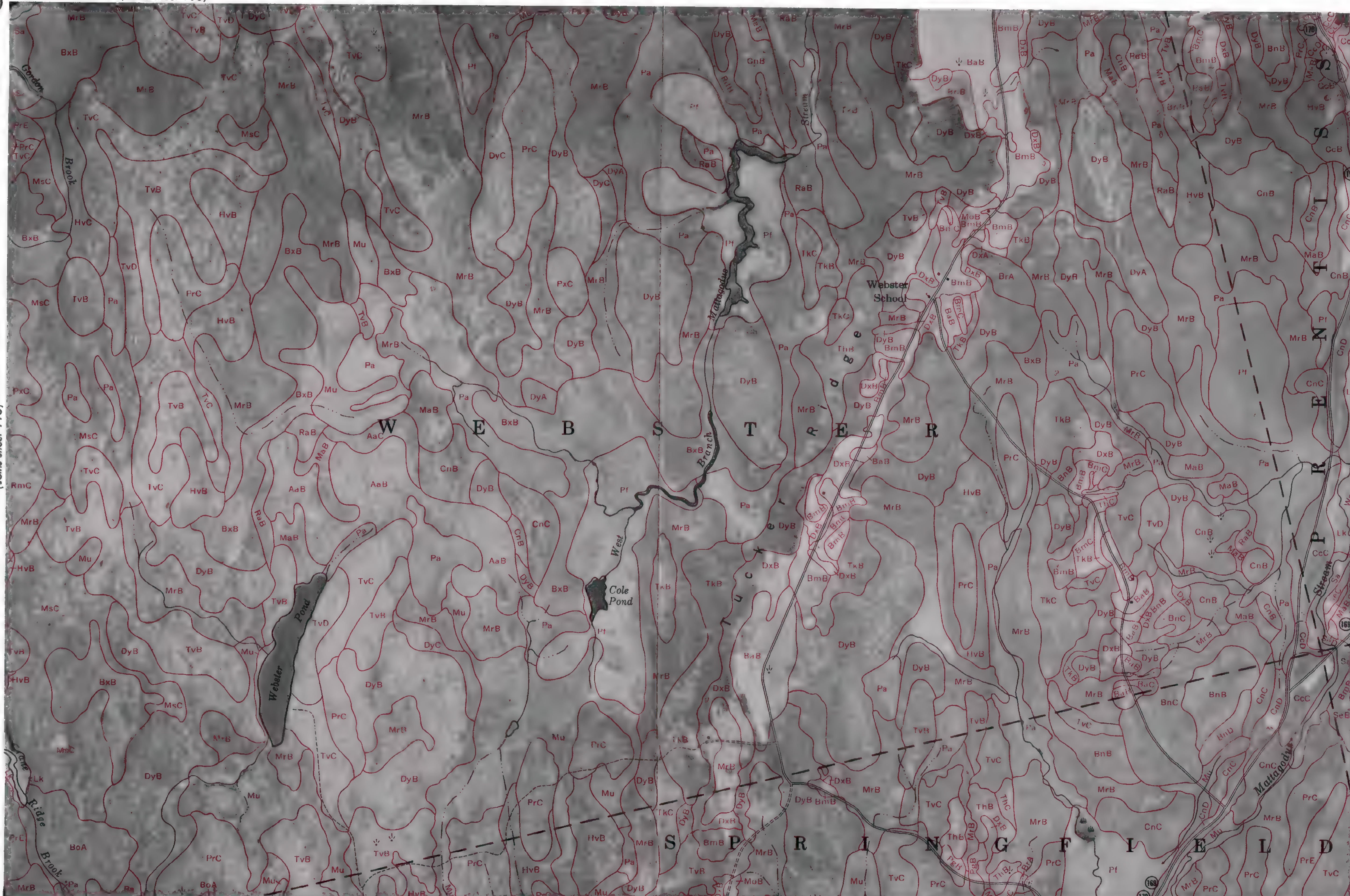
0 ½ 1 Mile Scale 1:20 000 0 5000 Feet

This map is one of a set compiled in 1962, as part of a soil survey by the Soil Conservation Service, United States Department of Agriculture, and the Maine Agricultural Experiment Station.

114

(Joins sheet 105)

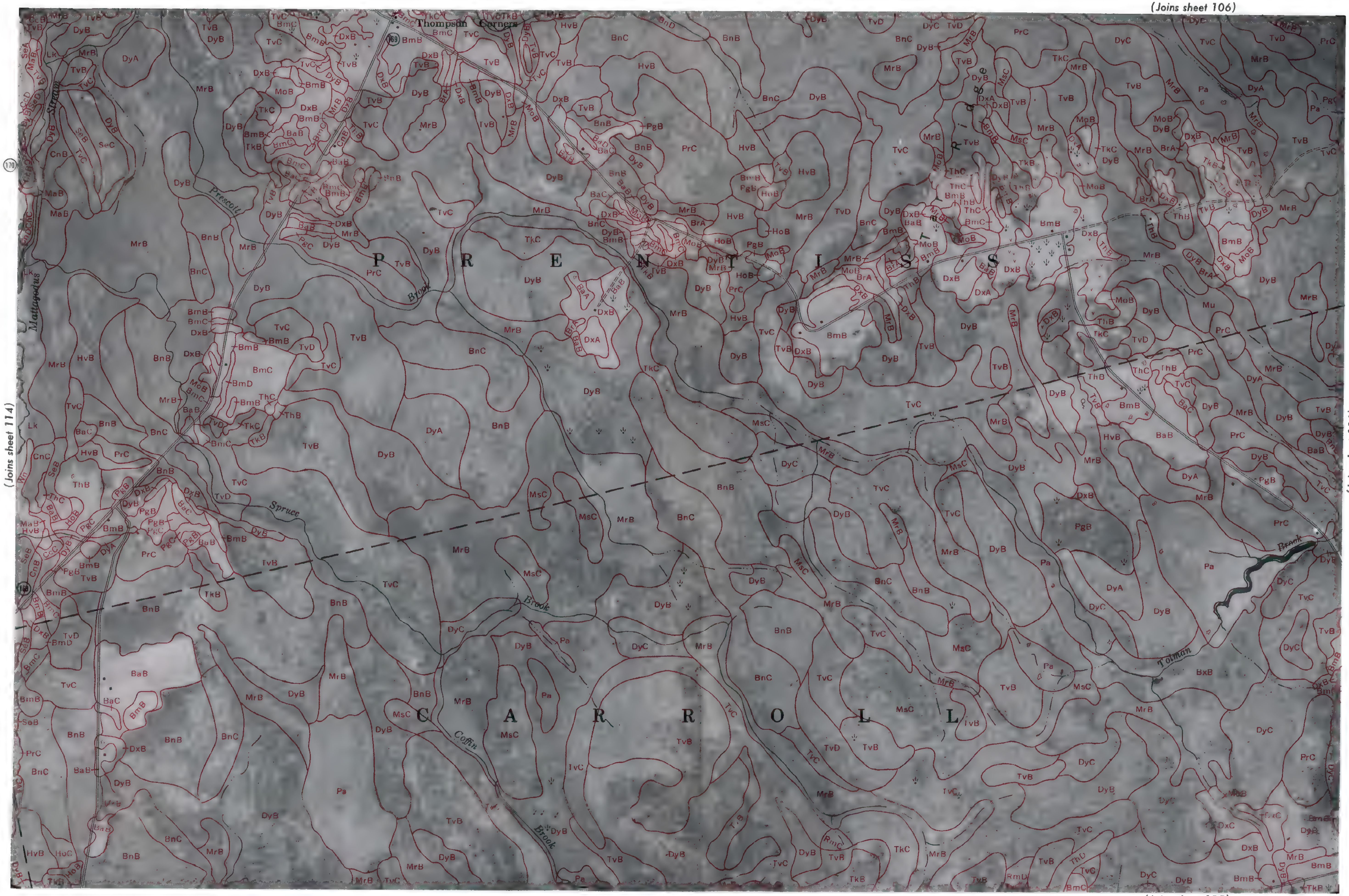
(Joins sheet 113)



(Joins sheet 115)

(Joins sheet 124)

0 ½ 1 Mile Scale 1:20 000 0 5000 Feet



This map is one of a set compiled in 1962, as part of a soil survey by the Soil Conservation Service, United States Department of Agriculture, and the Maine Agricultural Experiment Station.

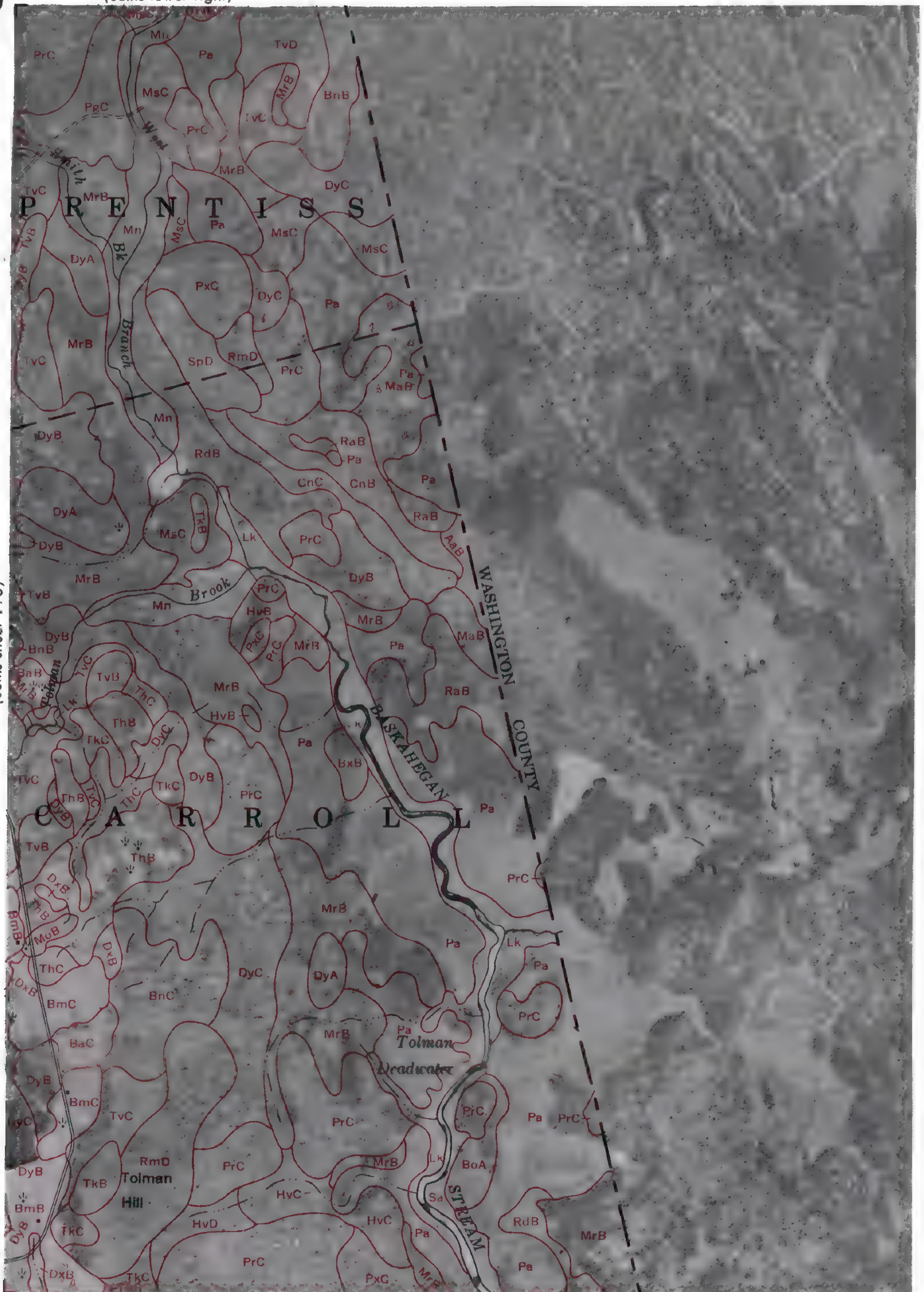
0 ½ 1 Mile Scale 1:20 000 0 5000 Feet

116

(Joins lower right)

N

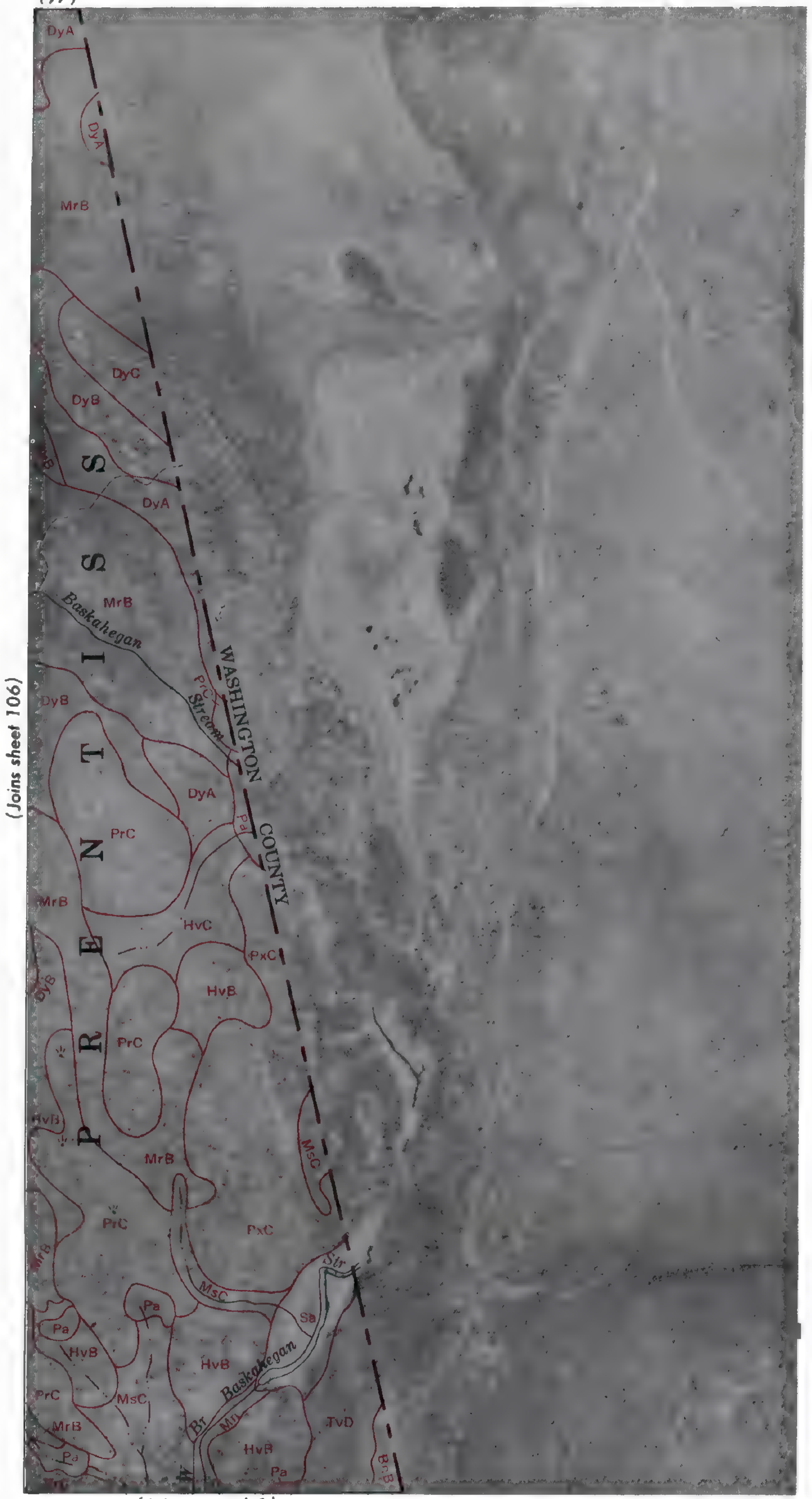
(Joins sheet 115)



(Joins sheet 126)

(97)

(Joins sheet 106)



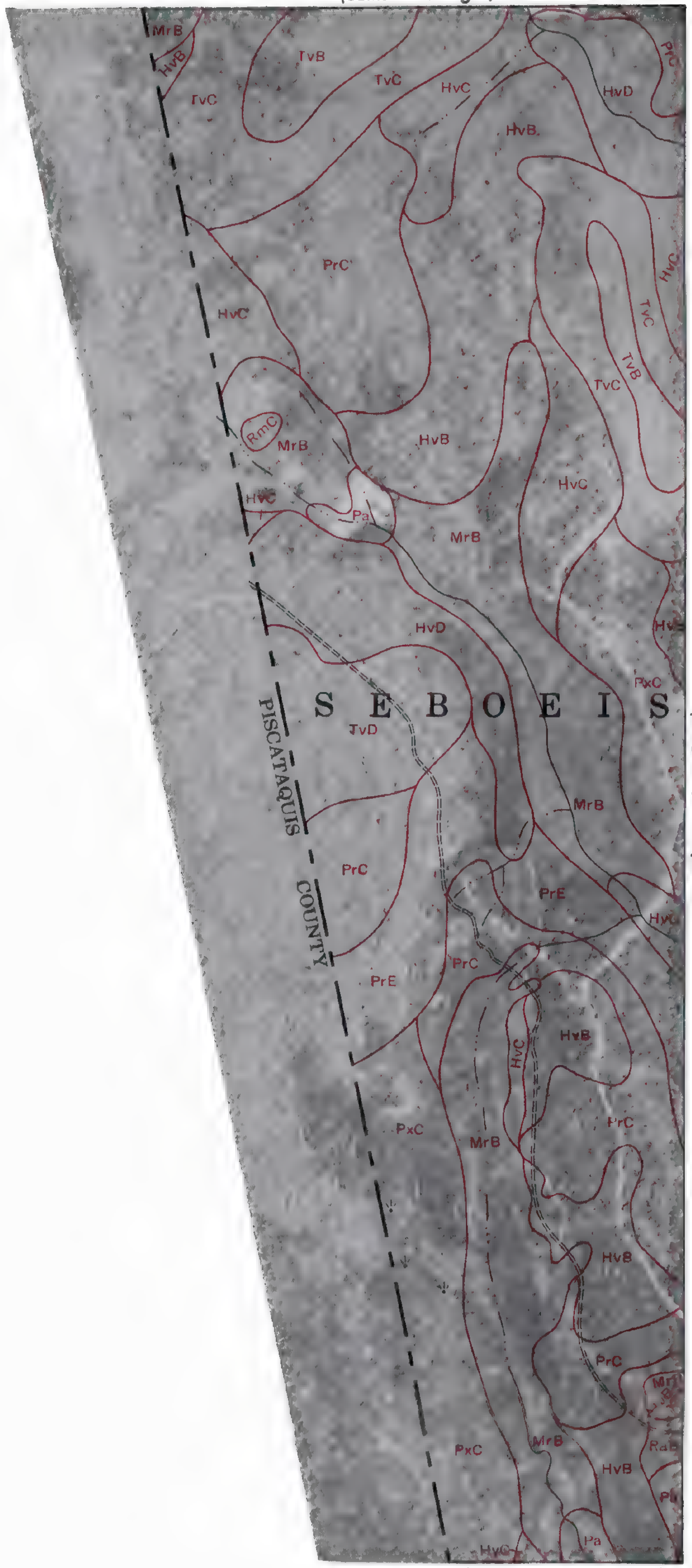
(Joins upper left)

0 ½ 1 Mile

Scale 1:20 000

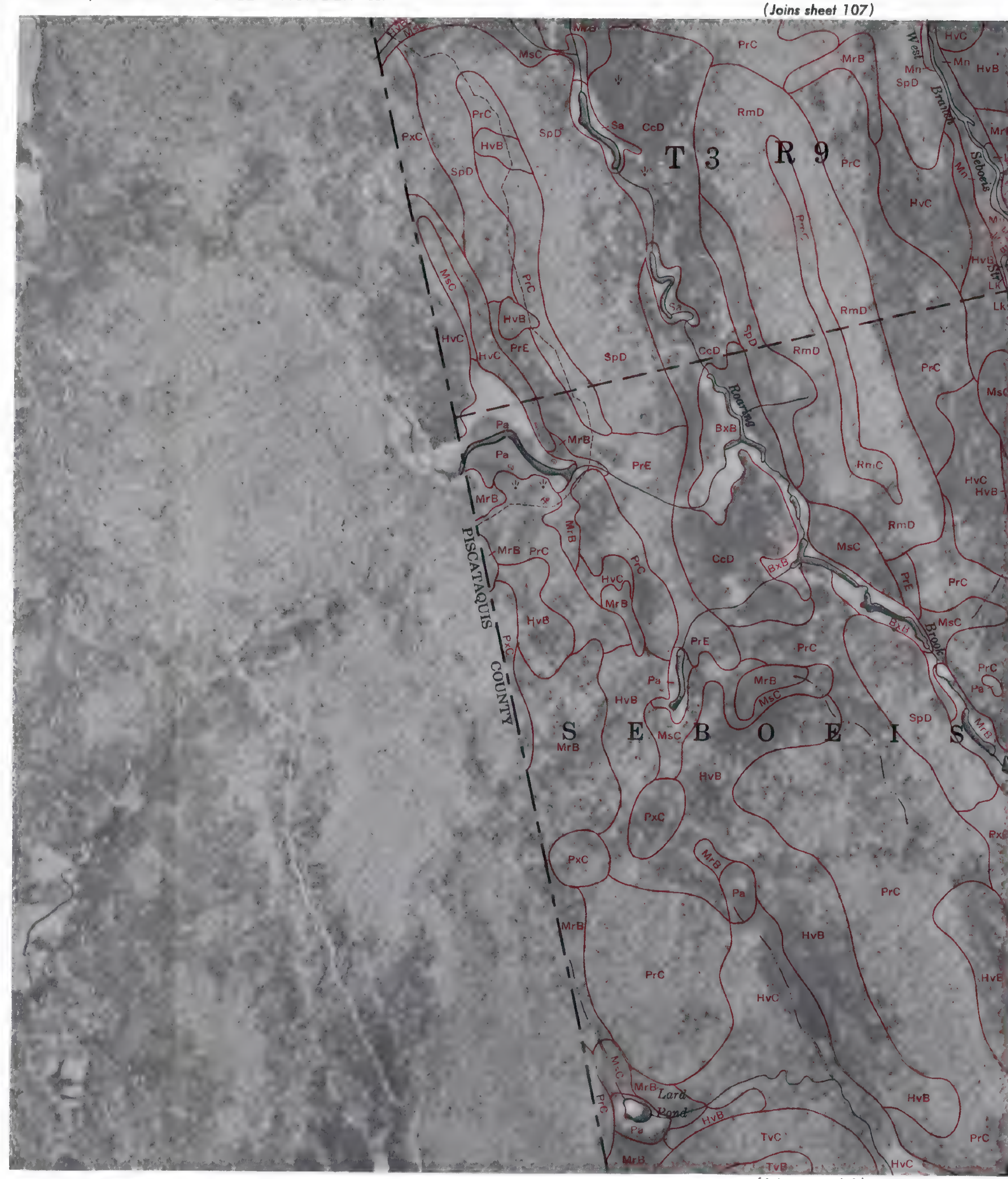
0 5000 Feet

(Joins lower right)



(Joins sheet 127)

(Joins sheet 107)



N

(Joins sheet 118)

(Joins inset, sheet 107)

(Joins upper left)

Scale 1:20 000

0 ½ 1 Mile

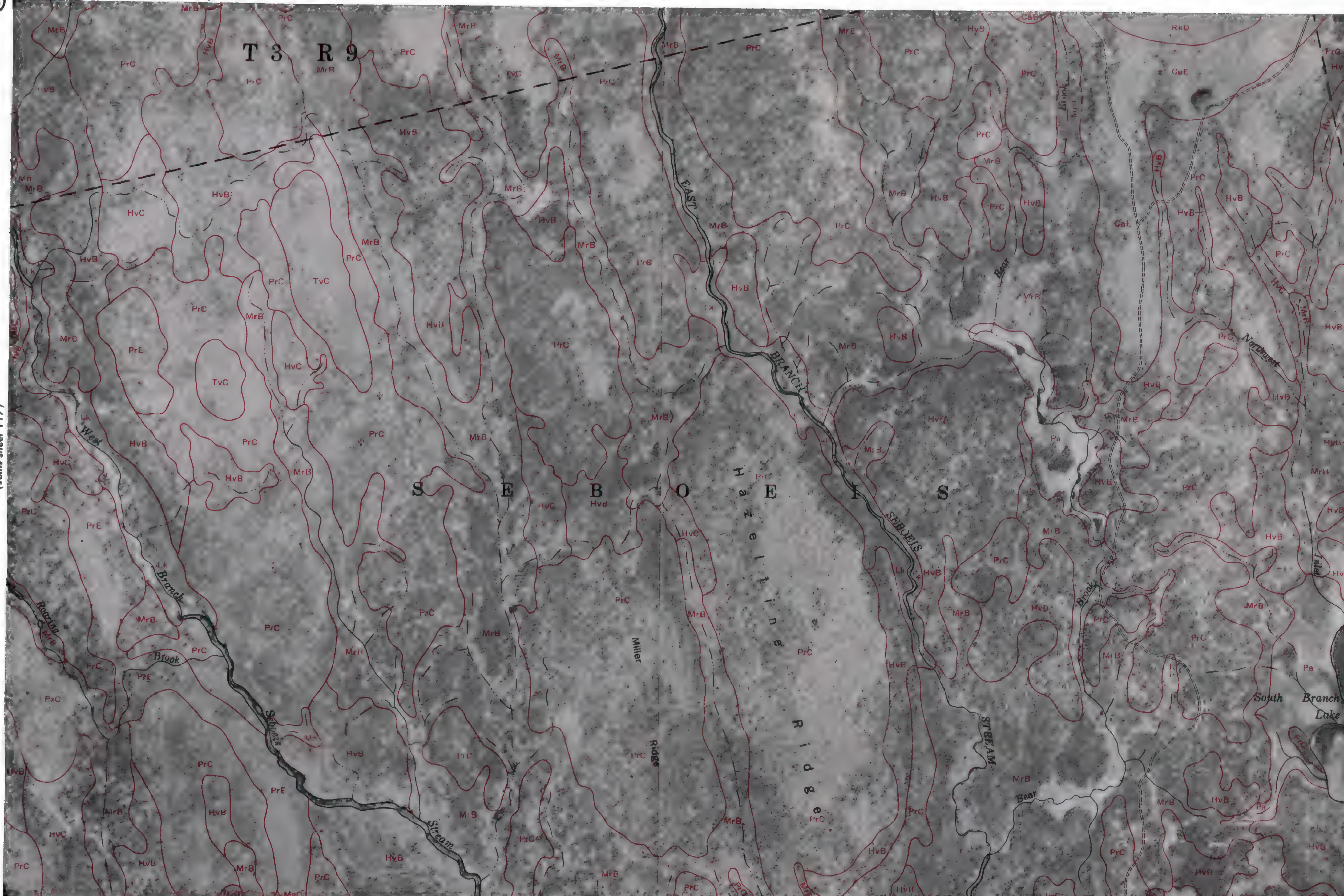
0 5000 Feet

This map is one of a set compiled in 1962, as part of a soil survey by the Soil Conservation Service, United States Department of Agriculture, and the Maine Agricultural Experiment Station.

(Joins sheet 108)

N

(Joins sheet 117)



(Joins sheet 119)

(Joins sheet 127)

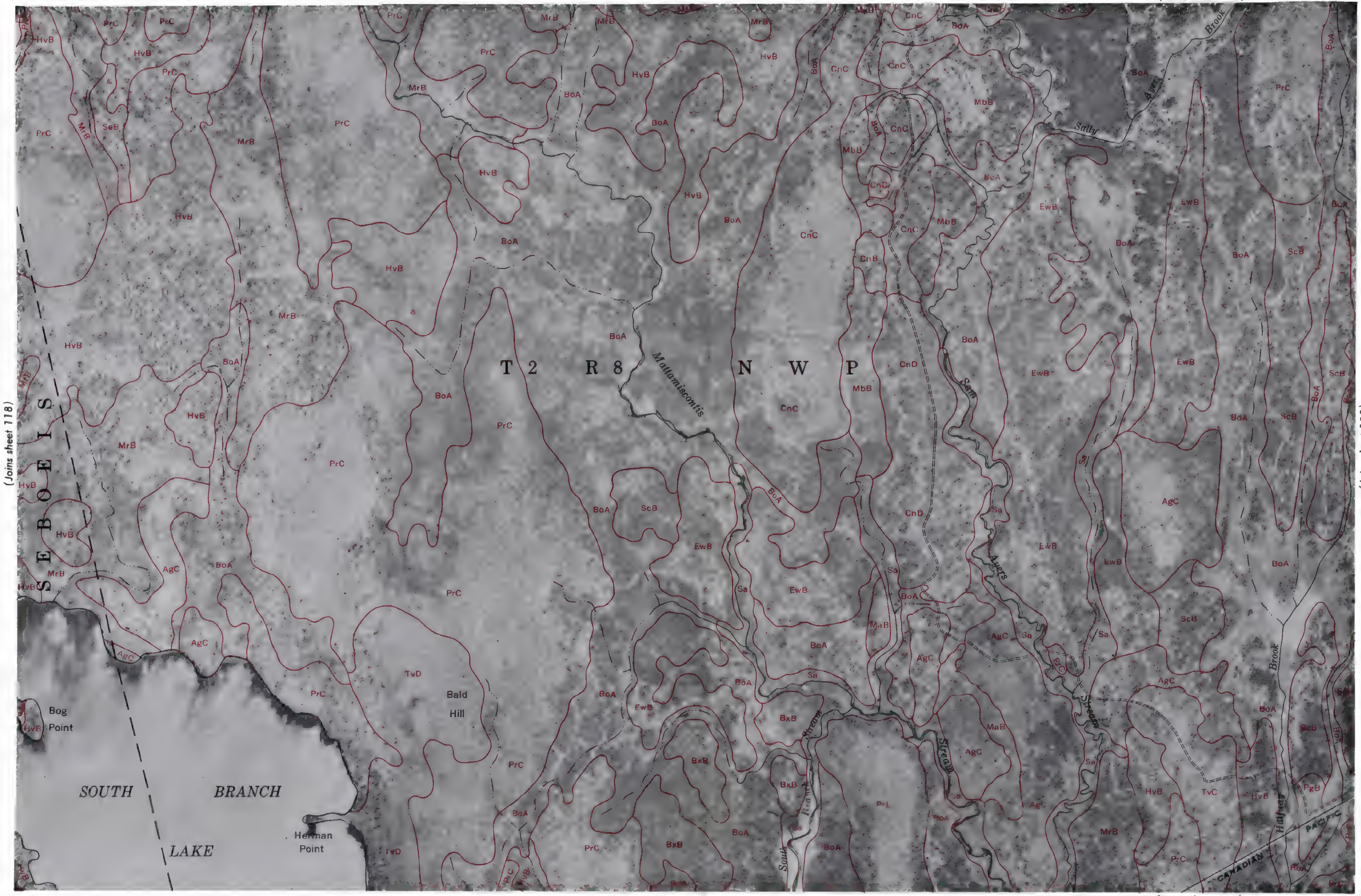
0 ½ 1 Mile Scale 1:20 000 0 5000 Feet

(Joins sheet 109)

119

(Joins sheet 118)

(Joins sheet 120)



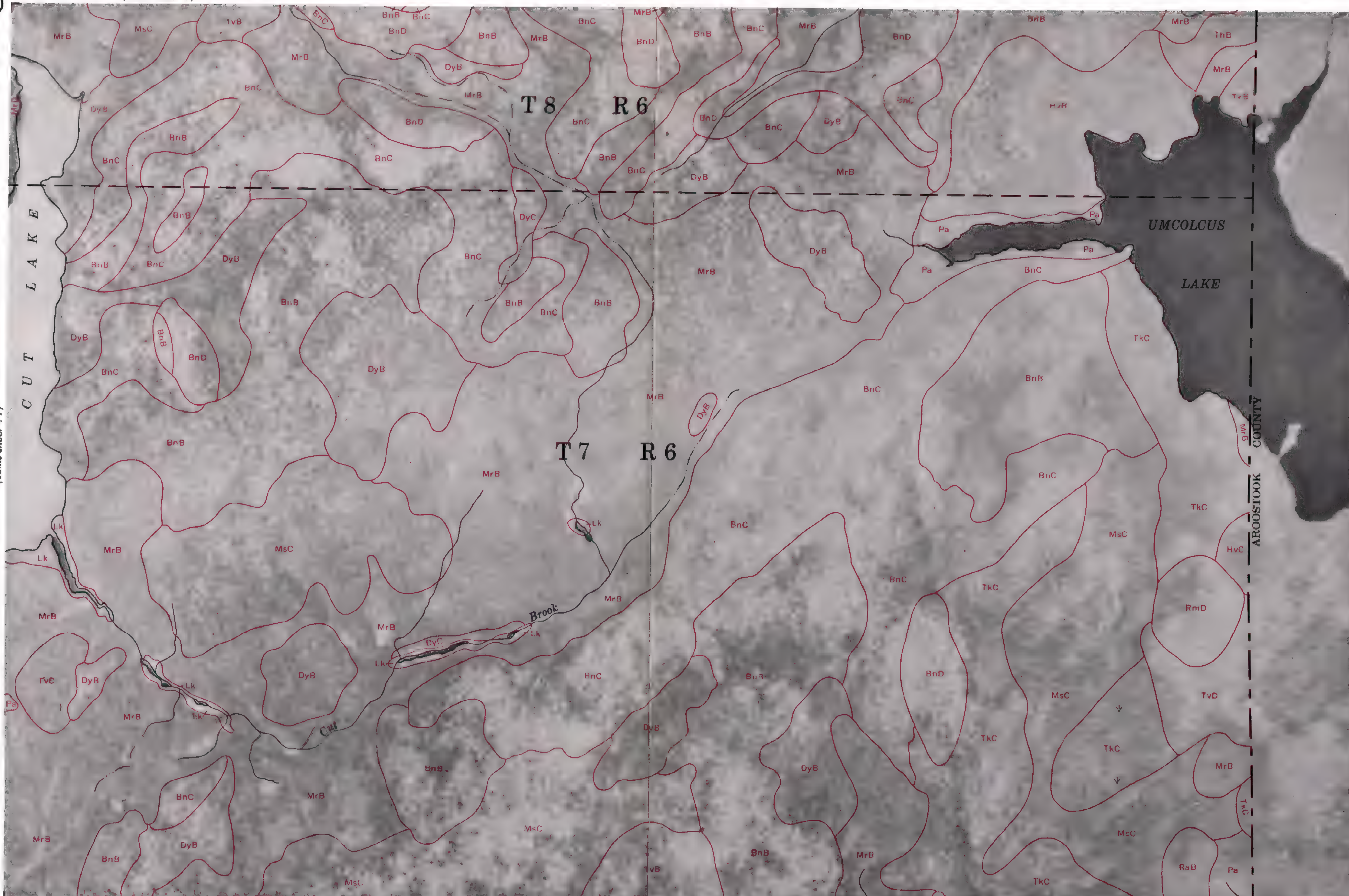
(Joins sheet 128)

0 ½ 1 Mile Scale 1:20 000 0 5000 Feet

This map is one of a set compiled in 1962, as part of a soil survey by the Soil Conservation Service, United States Department of Agriculture, and the Maine Agricultural Experiment Station.

(Joins sheet 8)

(Joins sheet 11)

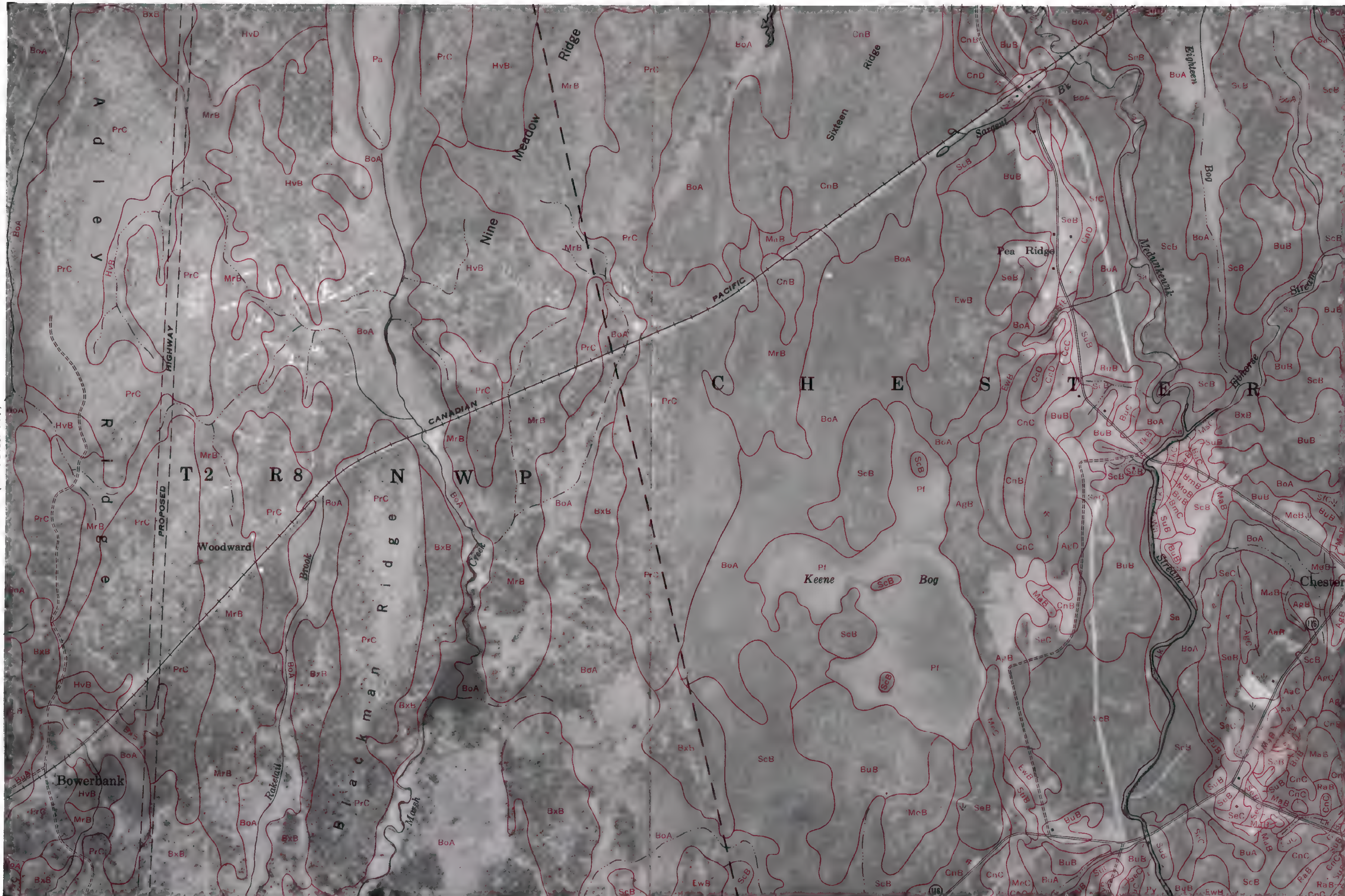


(Joins sheet 16)

0 ½ 1 Mile Scale 1:20 000 0 5000 Feet

(120)

(Joins sheet 110)

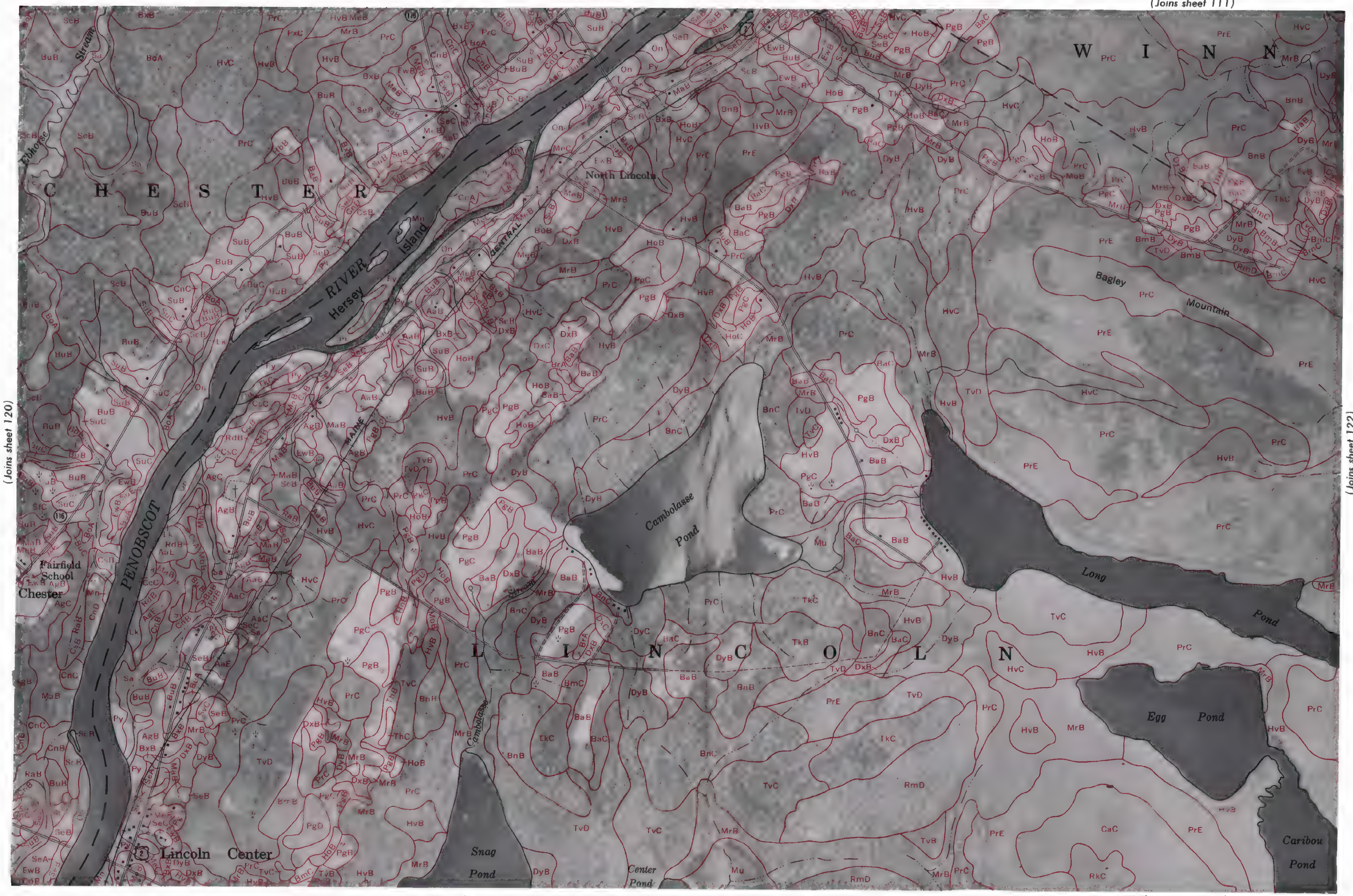


(Joins sheet 119)

(Joins sheet 121)

(Joins sheet 129)

0 ½ 1 Mile Scale 1:20 000 0 5000 Feet



0 ½ 1 Mile Scale 1:20 000 0 5000 Feet

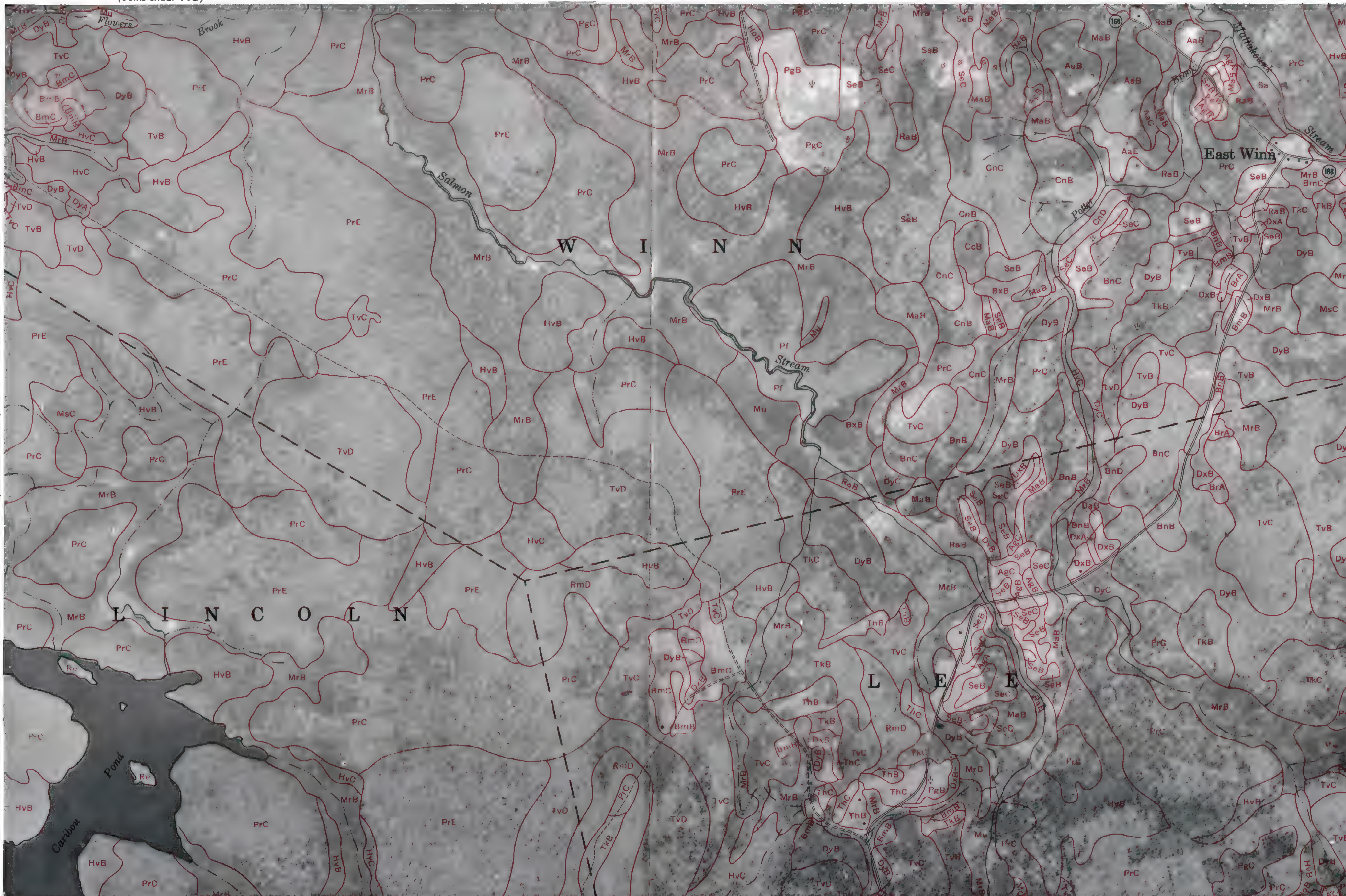
This map is one of a set compiled in 1962, as part of a soil survey by the Soil Conservation Service, United States Department of Agriculture, and the Maine Agricultural Experiment Station.

122

(Joins sheet 112)

N

(Joins sheet 121)



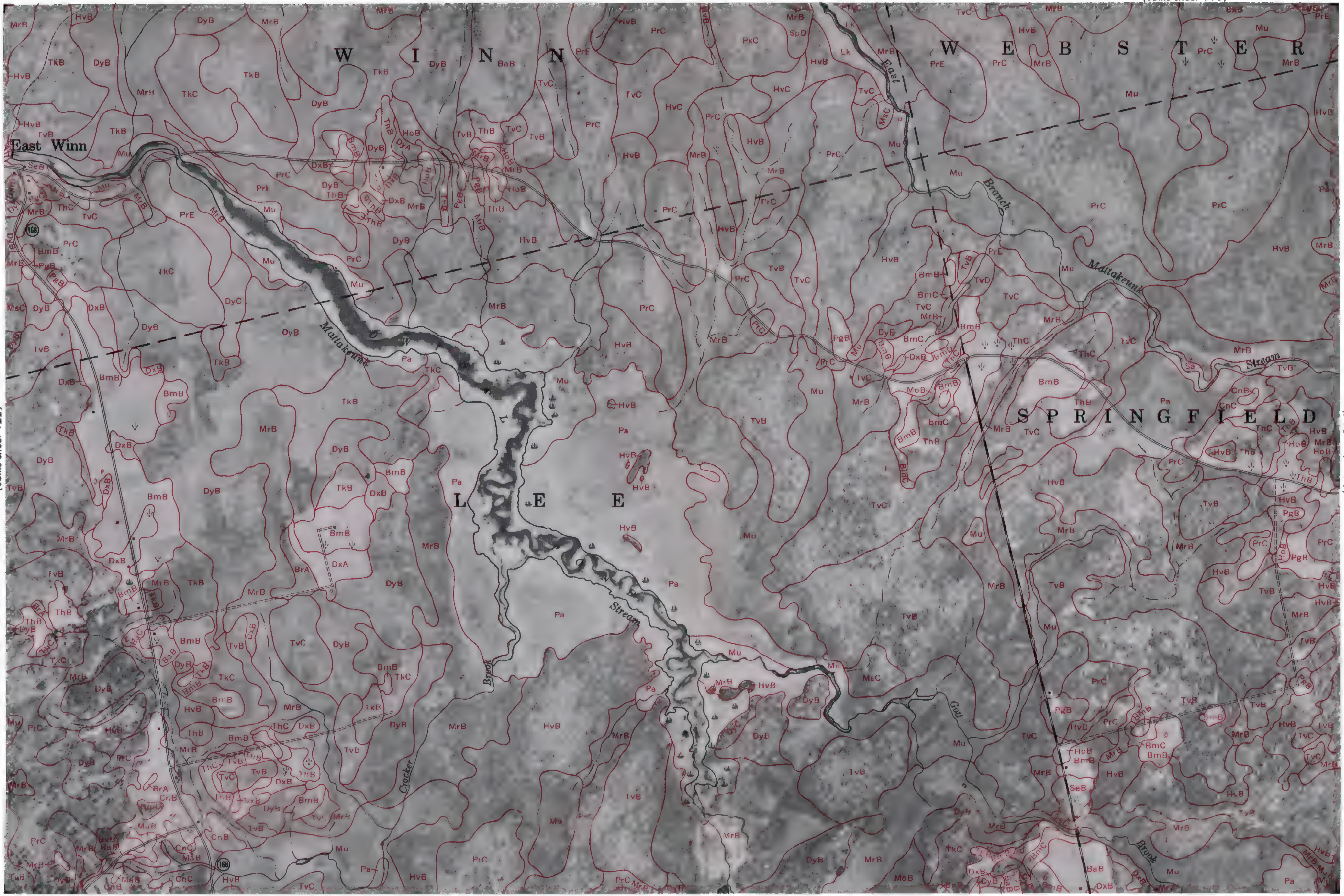
(Joins sheet 123)

(Joins sheet 131)

0 ½ 1 Mile Scale 1:20 000 0 5000 Feet

(Joins sheet 113)

123



N

(Joins sheet 122)

(Joins sheet 124)

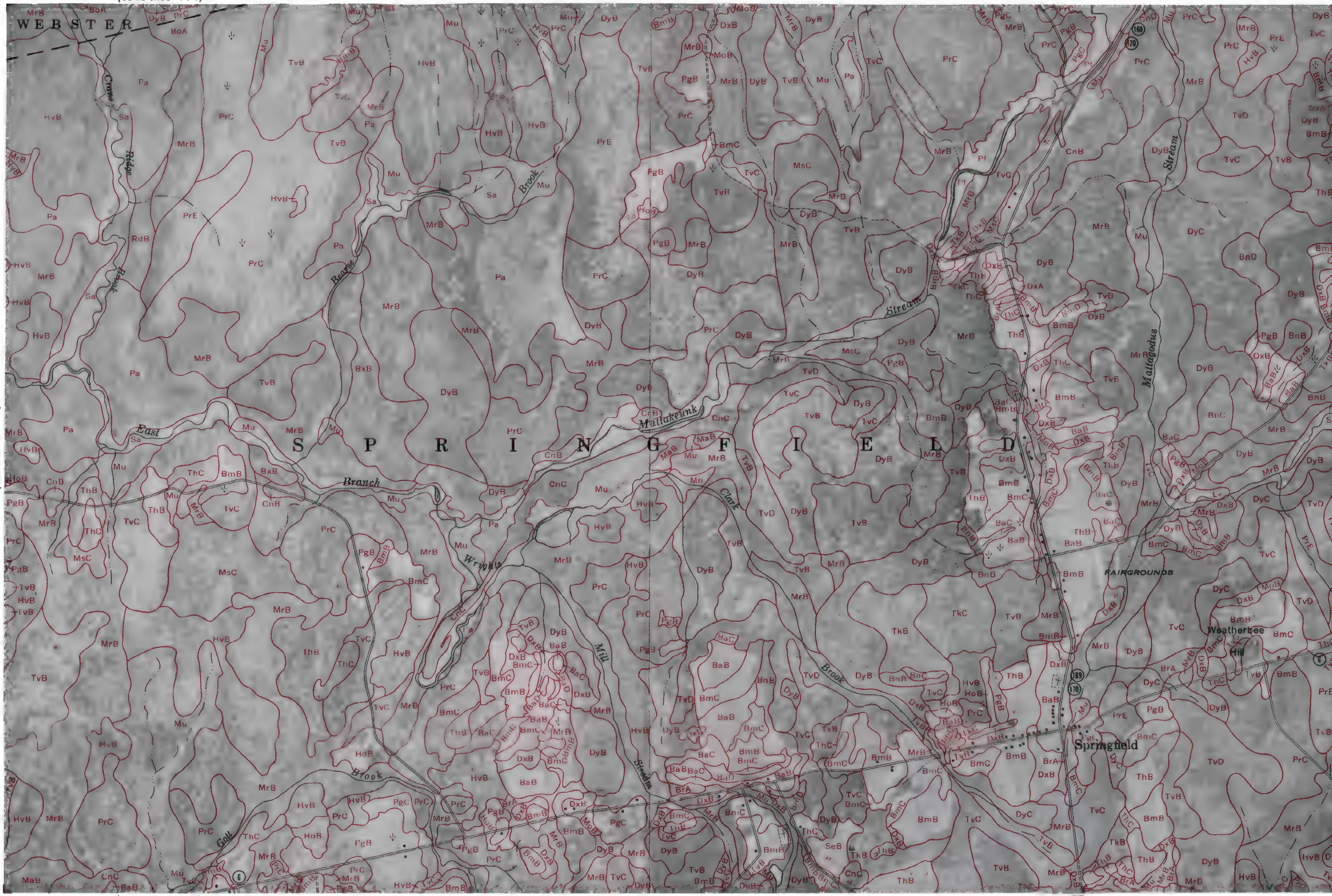
(Joins sheet 132)

0 ½ 1 Mile Scale 1:20 000 0 5000 Feet

This map is one of a set compiled in 1962, as part of a soil survey by the Soil Conservation Service, United States Department of Agriculture, and the Maine Agricultural Experiment Station.

124

(Joins sheet 114)



(Joins sheet 123)

(Joins sheet 125)

(Joins sheet 133)

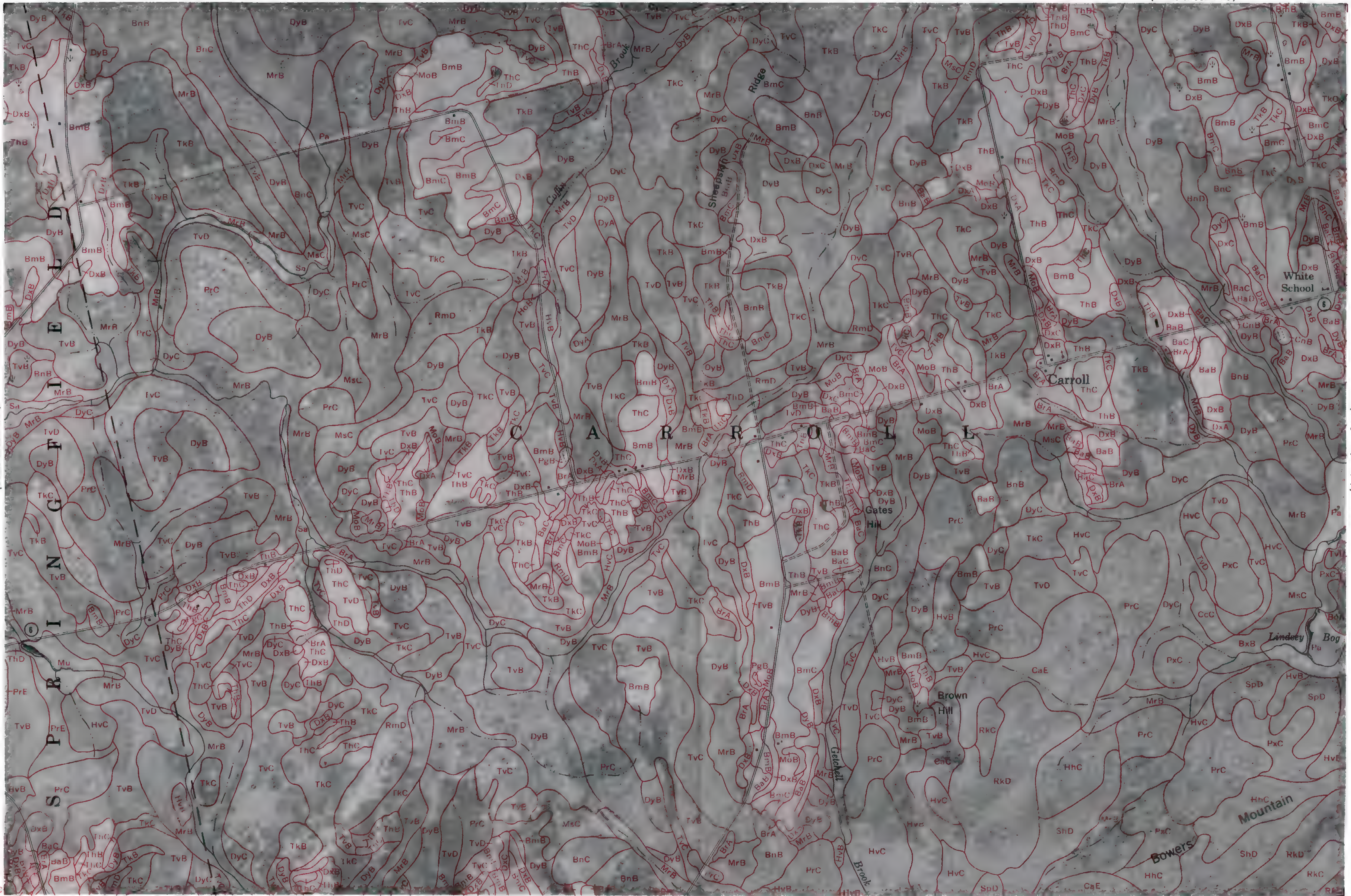
0 ½ 1 Mile Scale 1:20 000 0 5000 Feet

(Joins sheet 115)

125

This map is one of a set compiled in 1962, as part of a soil survey by the Soil Conservation Service, United States Department of Agriculture, and the Maine Agricultural Experiment Station.

(Joins sheet 124)



(Joins sheet 126)

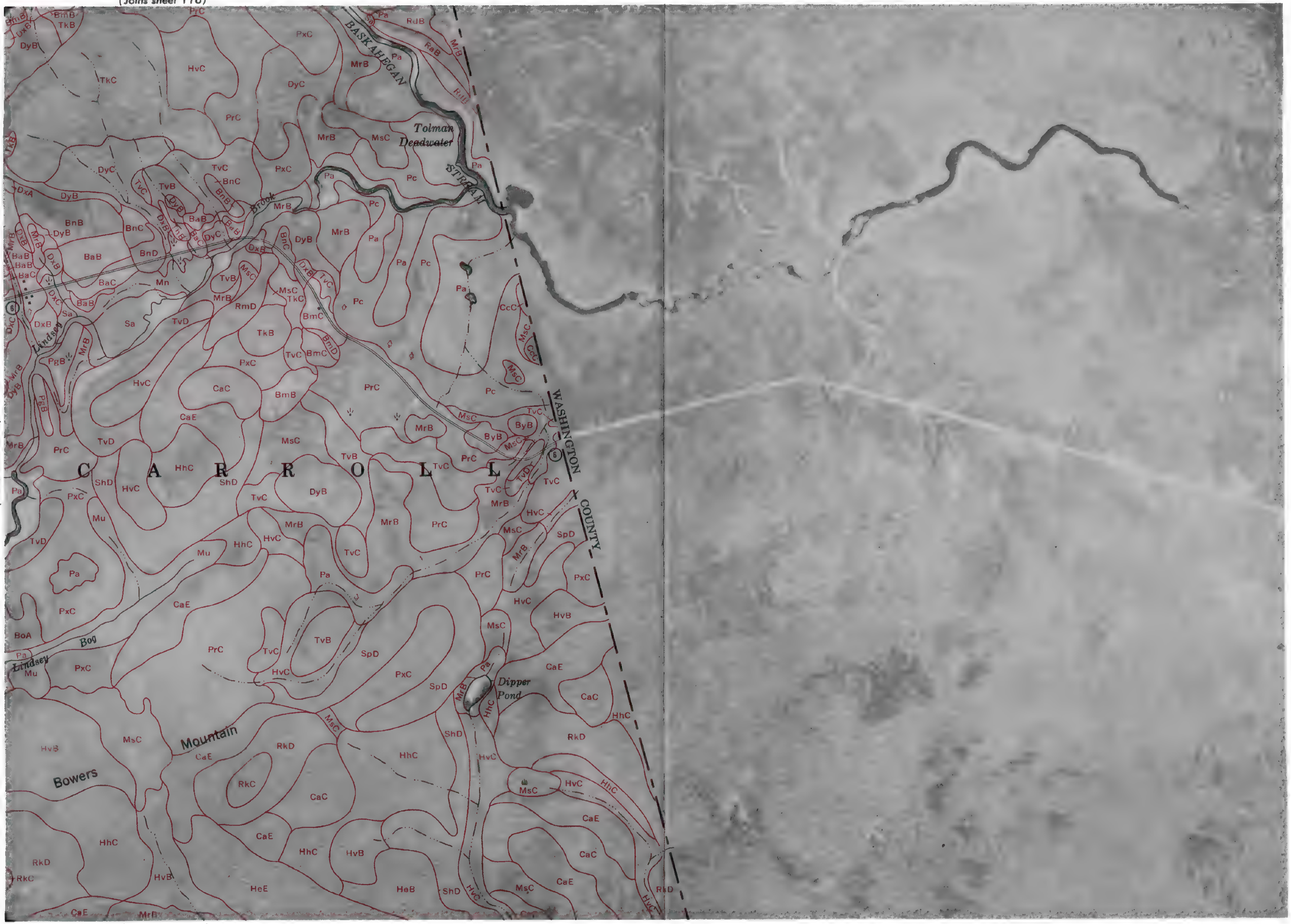
(Joins sheet 134)

0 ½ 1 Mile Scale 1:20 000 0 5000 Feet

126

(Joins sheet 116)

(Joins sheet 125)

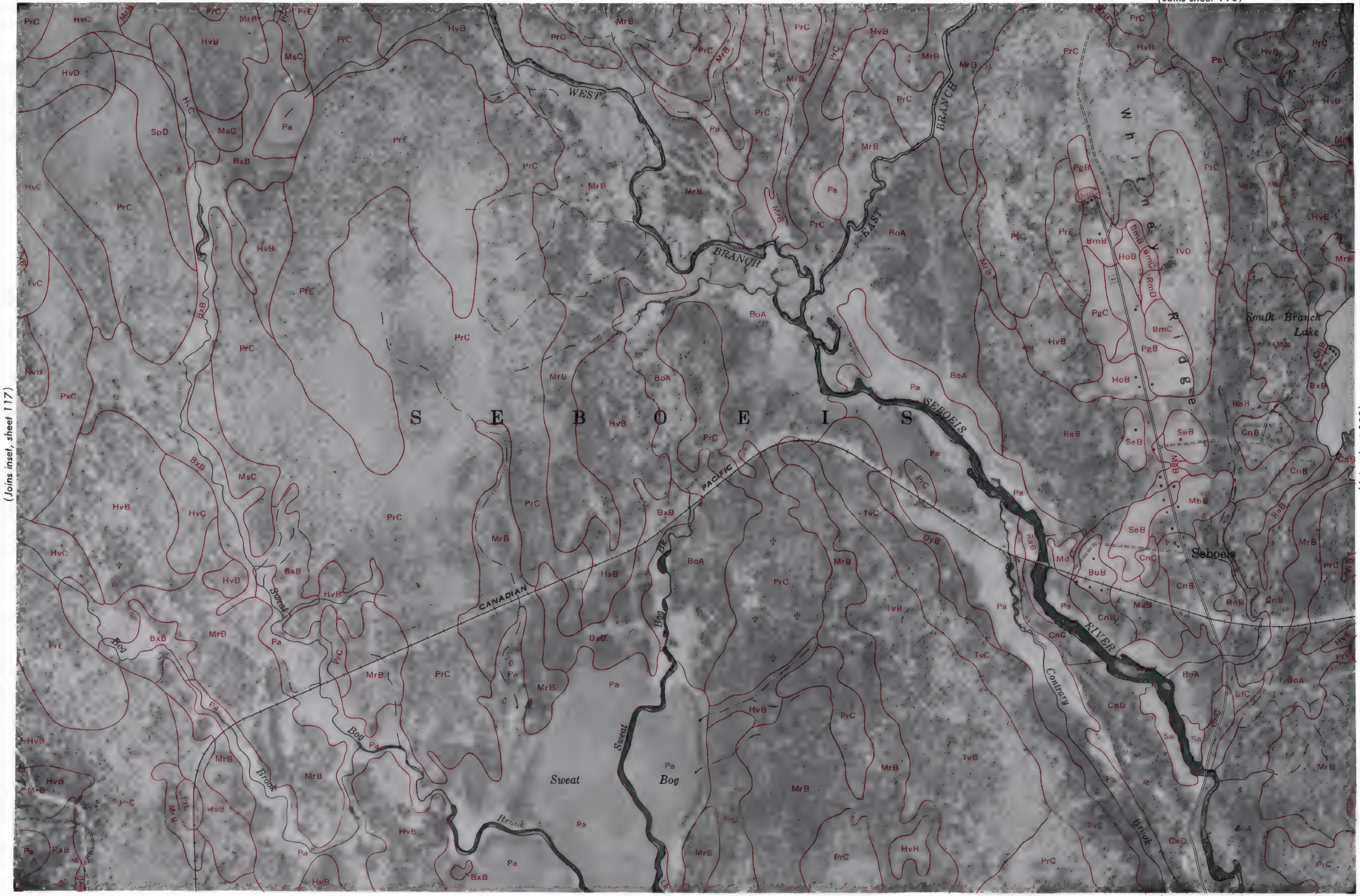


(Joins sheet 135)

0 ½ 1 Mile Scale 1:20 000 0 5000 Feet

(Joins sheet 118)

127



(Joins inset, sheet 117)

(Joins sheet 128)

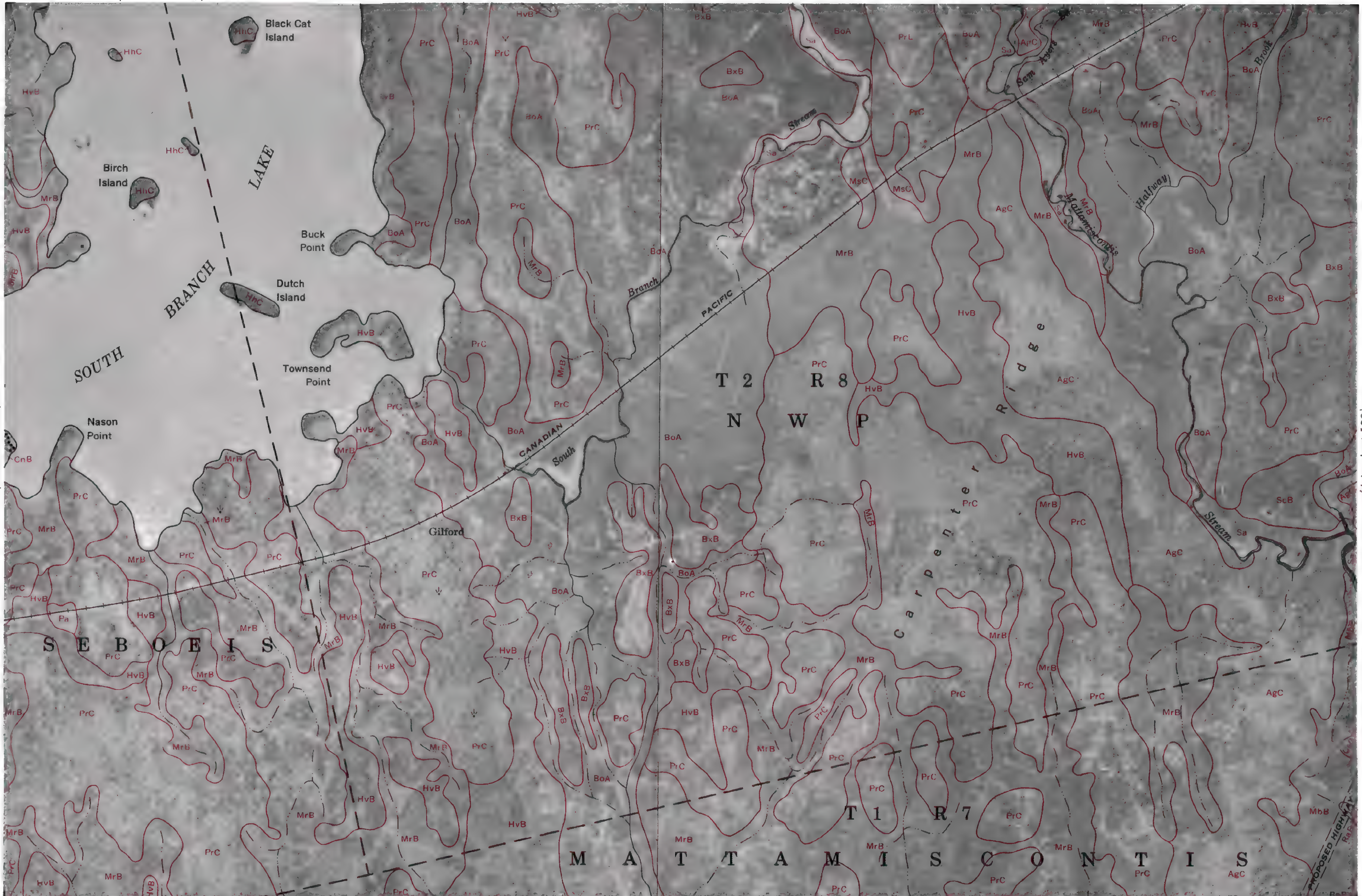
(Joins sheet 136)

0 ½ 1 Mile Scale 1:20 000 0 5000 Feet

This map is one of a set compiled in 1962, as part of a soil survey by the Soil Conservation Service, United States Department of Agriculture, and the Maine Agricultural Experiment Station.

(Joins sheet 119)

(Joins sheet 127)

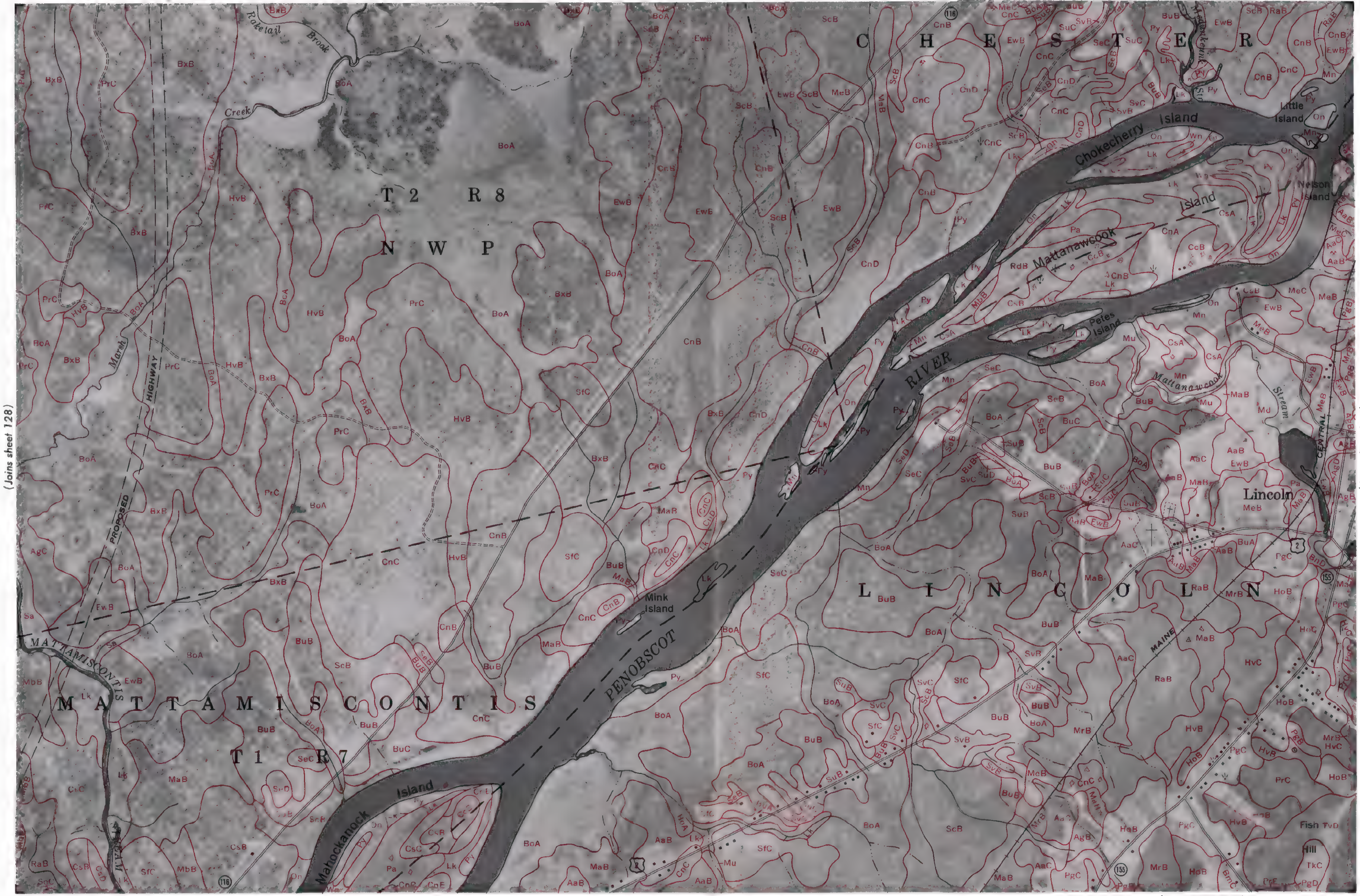


(Joins sheet 129)

(Joins sheet 137)

0 ½ 1 Mile Scale 1:20 000 0 5000 Feet

(Joins sheet 120)



(Joins sheet 128)

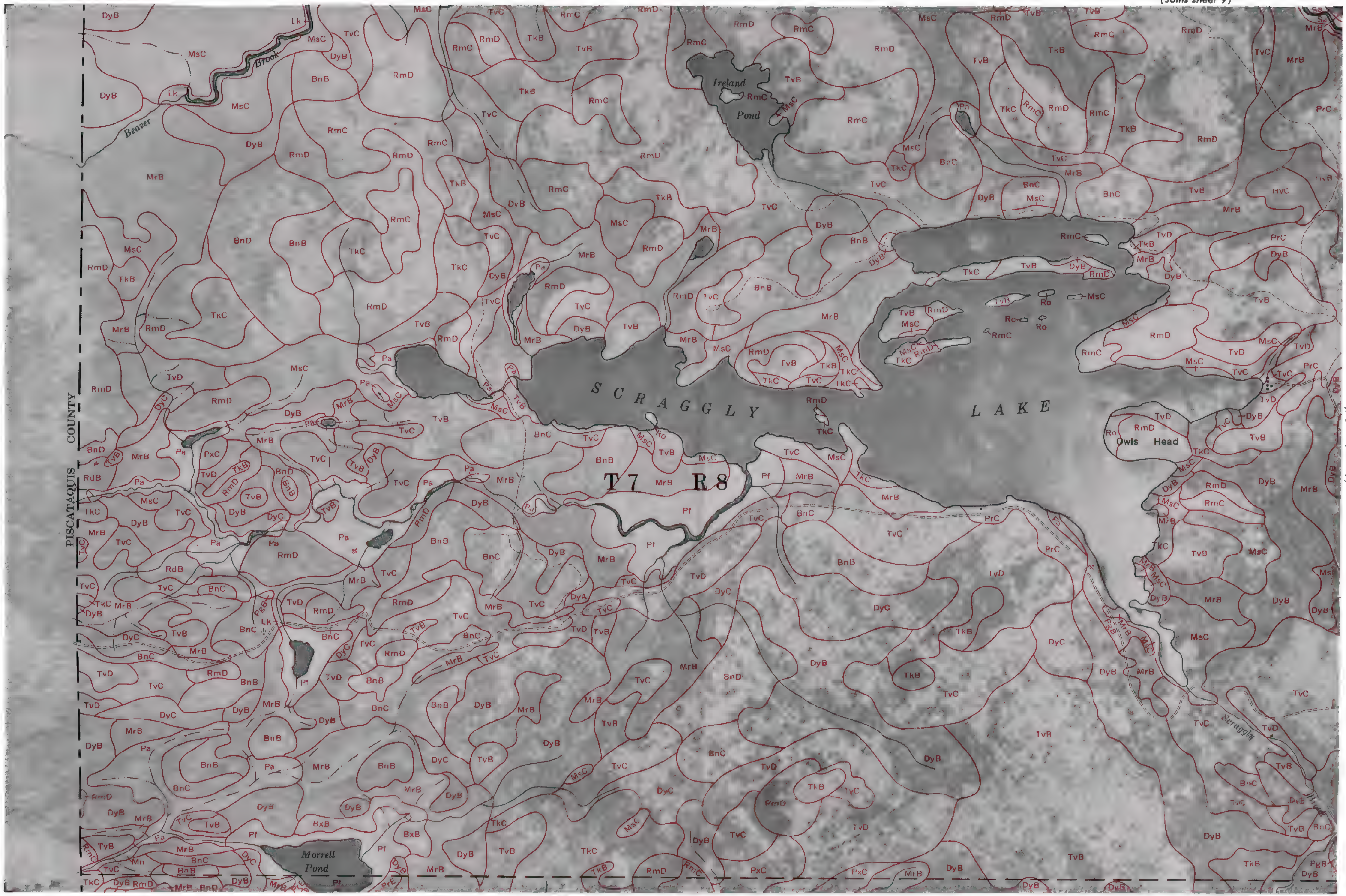
(Joins sheet 130)

(Joins sheet 138)

0 ½ 1 Mile Scale 1:20 000 0 5000 Feet

This map is one of a set compiled in 1962, as part of a soil survey by the Soil Conservation Service, United States Department of Agriculture, and the Maine Agricultural Experiment Station

(Joins sheet 9)

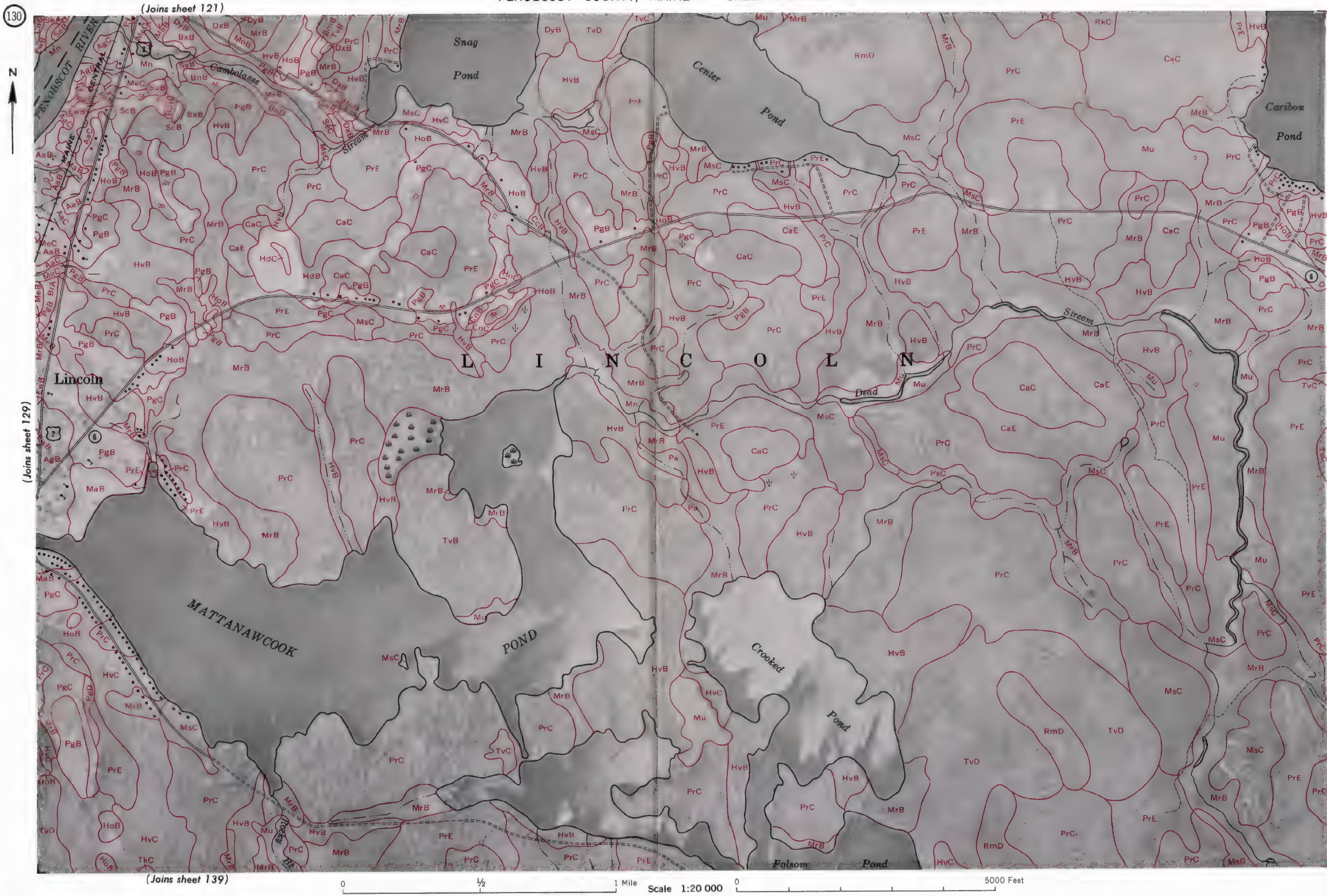


(Joins sheet 14)

(Joins sheet 17)

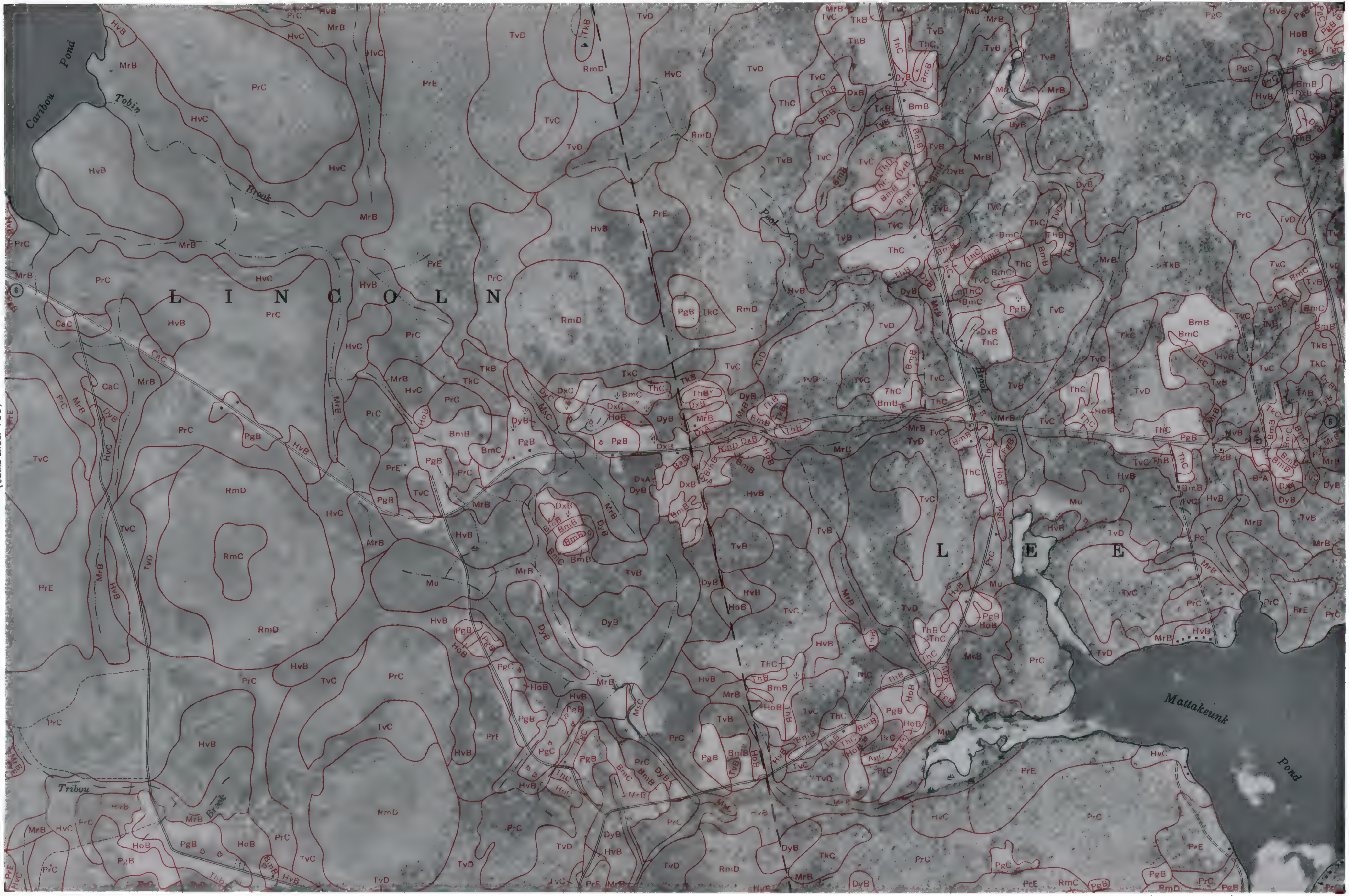
0 ½ 1 Mile Scale 1:20 000 0 5000 Feet

This map is one of a set compiled in 1962, as part of a soil survey by the Soil Conservation Service, United States Department of Agriculture, and the Maine Agricultural Experiment Station.


130
(Joins sheet 121)
N
Snag Pond
Center Pond
Caribou Pond
Cambolasse Stream
PENOBSCOT RIVER
MAINE CENTRAL
L I N C O L N
Lincoln
Stream
Dead Stream
MATTANAWCOOK POND
Crooked Pond
Folsom Pond
(Joins sheet 129)
(Joins sheet 131)
(Joins sheet 139)
0 ½ 1 Mile
Scale 1:20 000
0 5000 Feet

(Joins sheet 122)

131



(Joins sheet 130)

(Joins sheet 132)

(Joins sheet 140)

0 ½ 1 Mile Scale 1:20 000 0 5000 Feet

This map is one of a set compiled in 1962, as part of a soil survey by the Soil Conservation Service, United States Department of Agriculture, and the Maine Agricultural Experiment Station.

132

(Joins sheet 123)

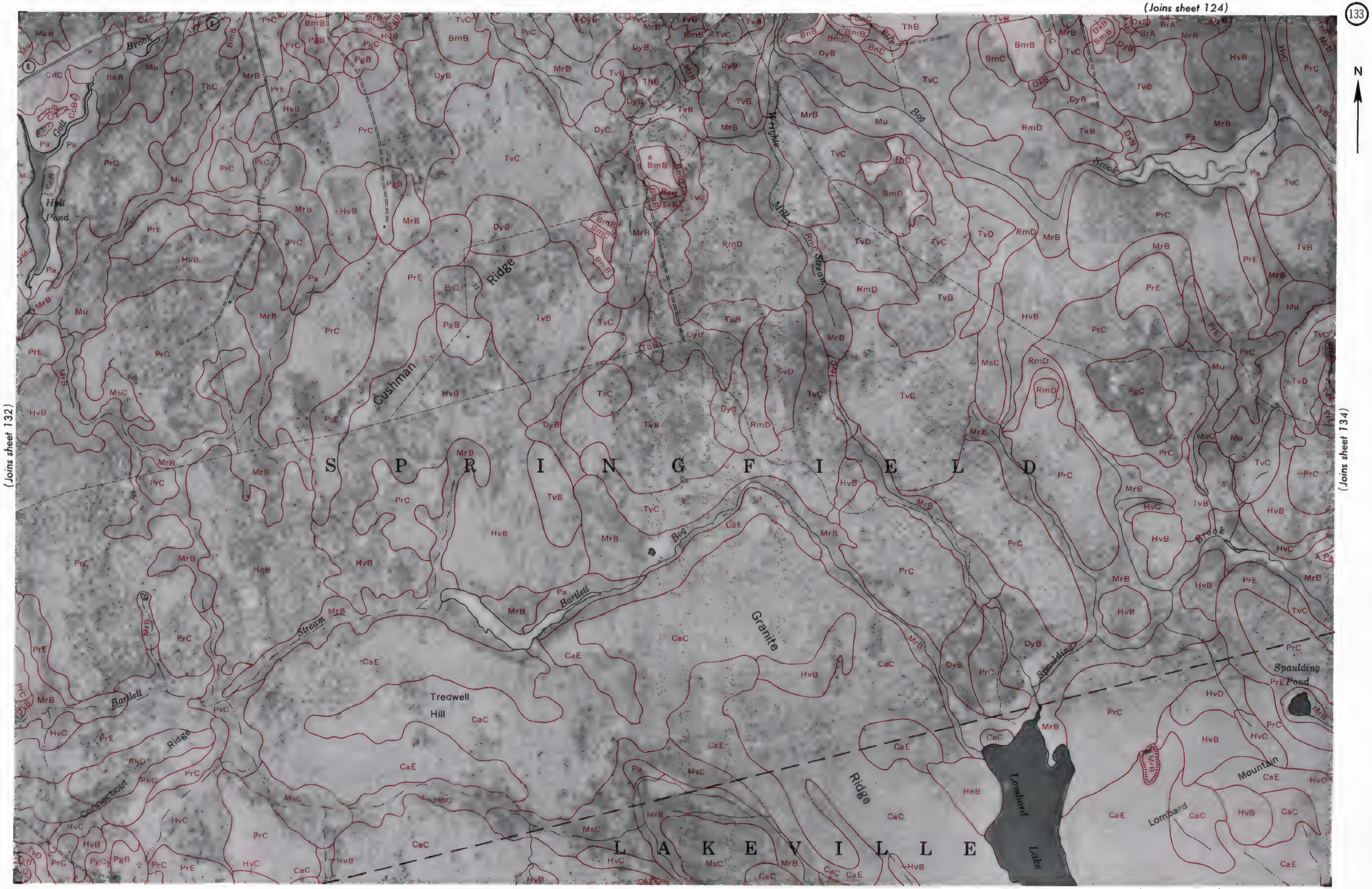
N

(Joins sheet 131)

(Joins sheet 133)

(Joins sheet 141)

0 ½ 1 Mile Scale 1:20 000 0 5000 Feet



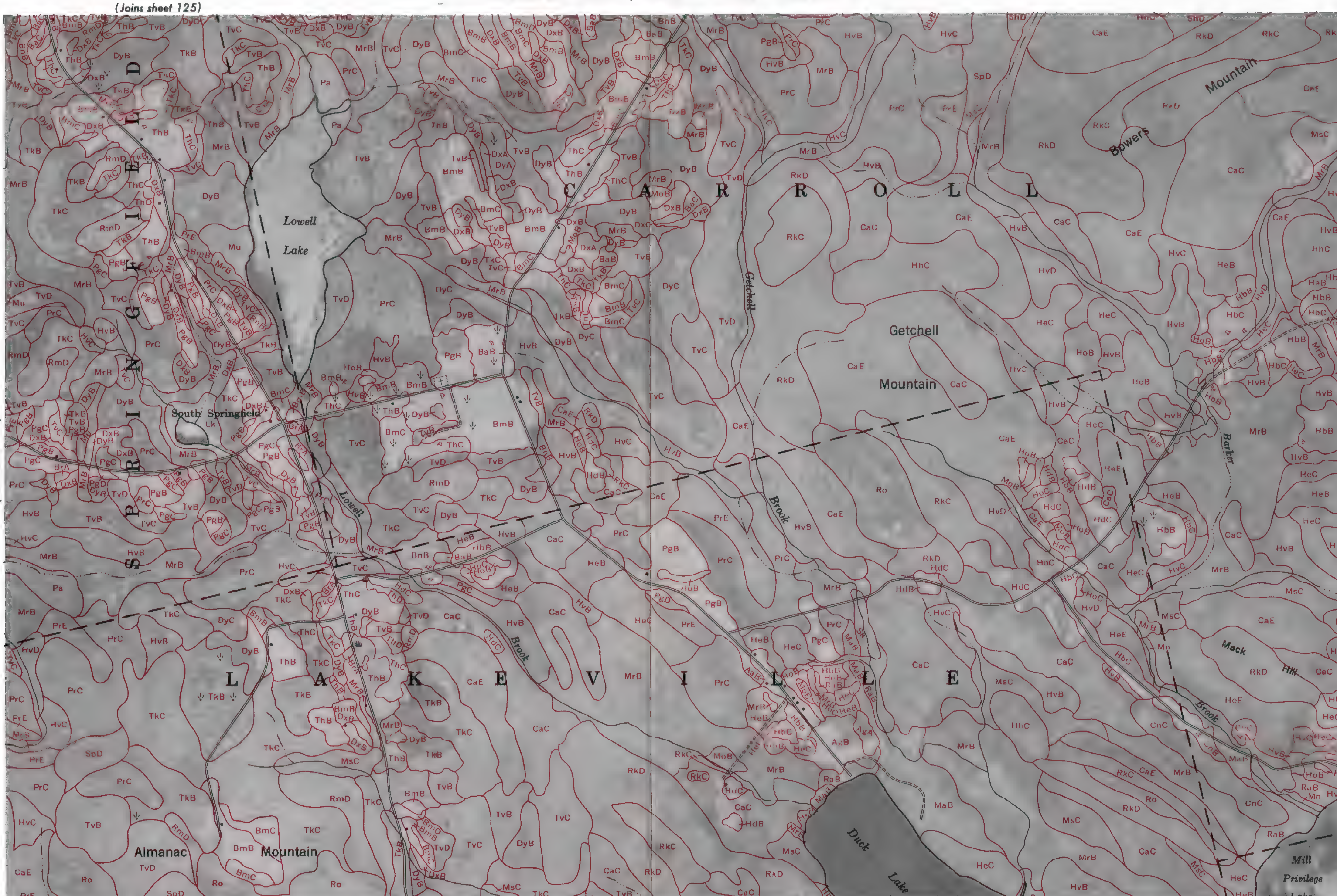
0 ½ 1 Mile Scale 1:20 000 0 5000 Feet

This map is one of a set compiled in 1962, as part of a soil survey by the Soil Conservation Service, United States Department of Agriculture, and the Maine Agricultural Experiment Station.

134

(Joins sheet 125)

(Joins sheet 133)



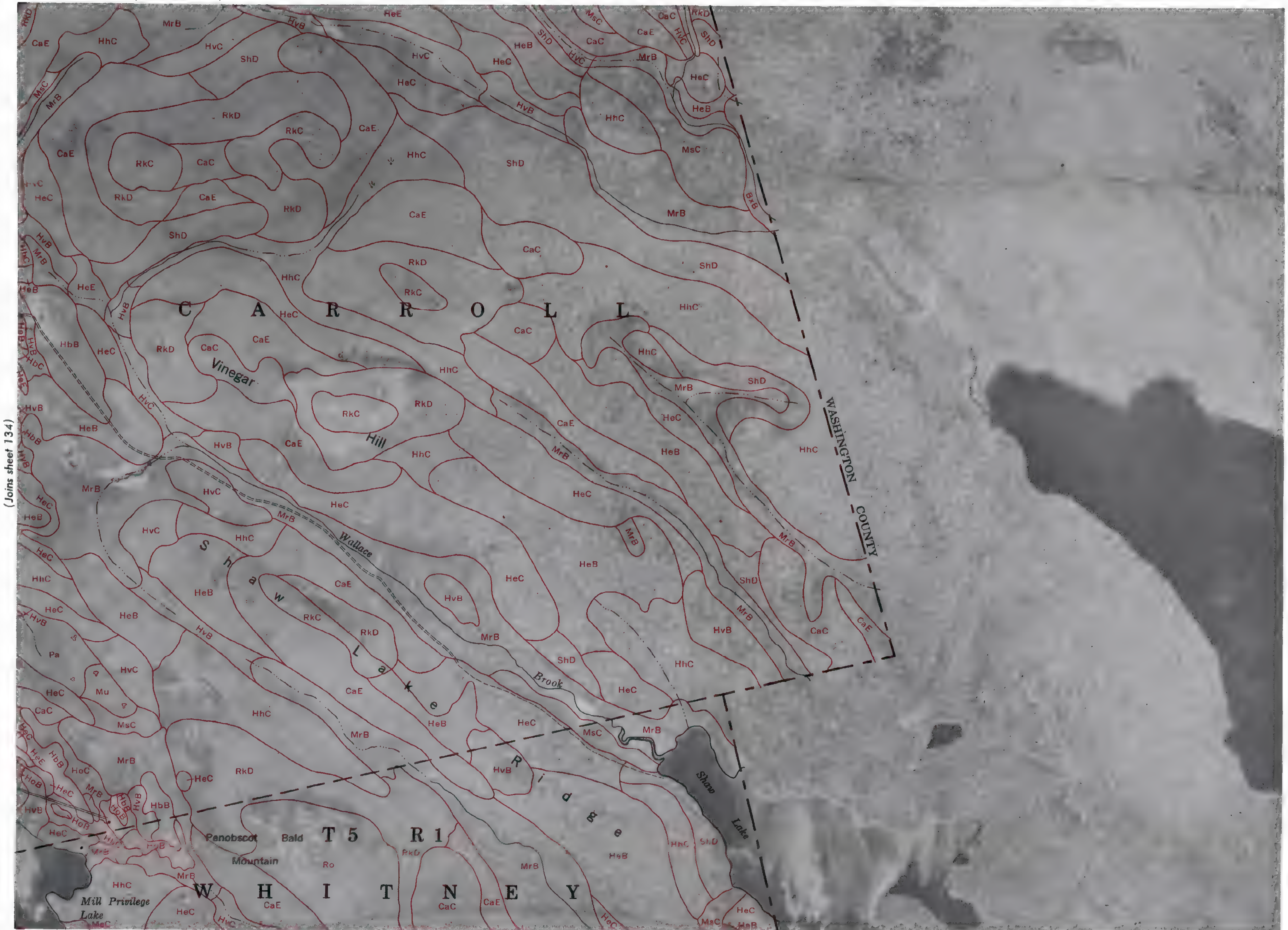
(Joins sheet 135)

(Joins sheet 143)

0 ½ 1 Mile Scale 1:20 000 0 5000 Feet

(Joins sheet 126)

(Joins sheet 134)



(Joins sheet 144)

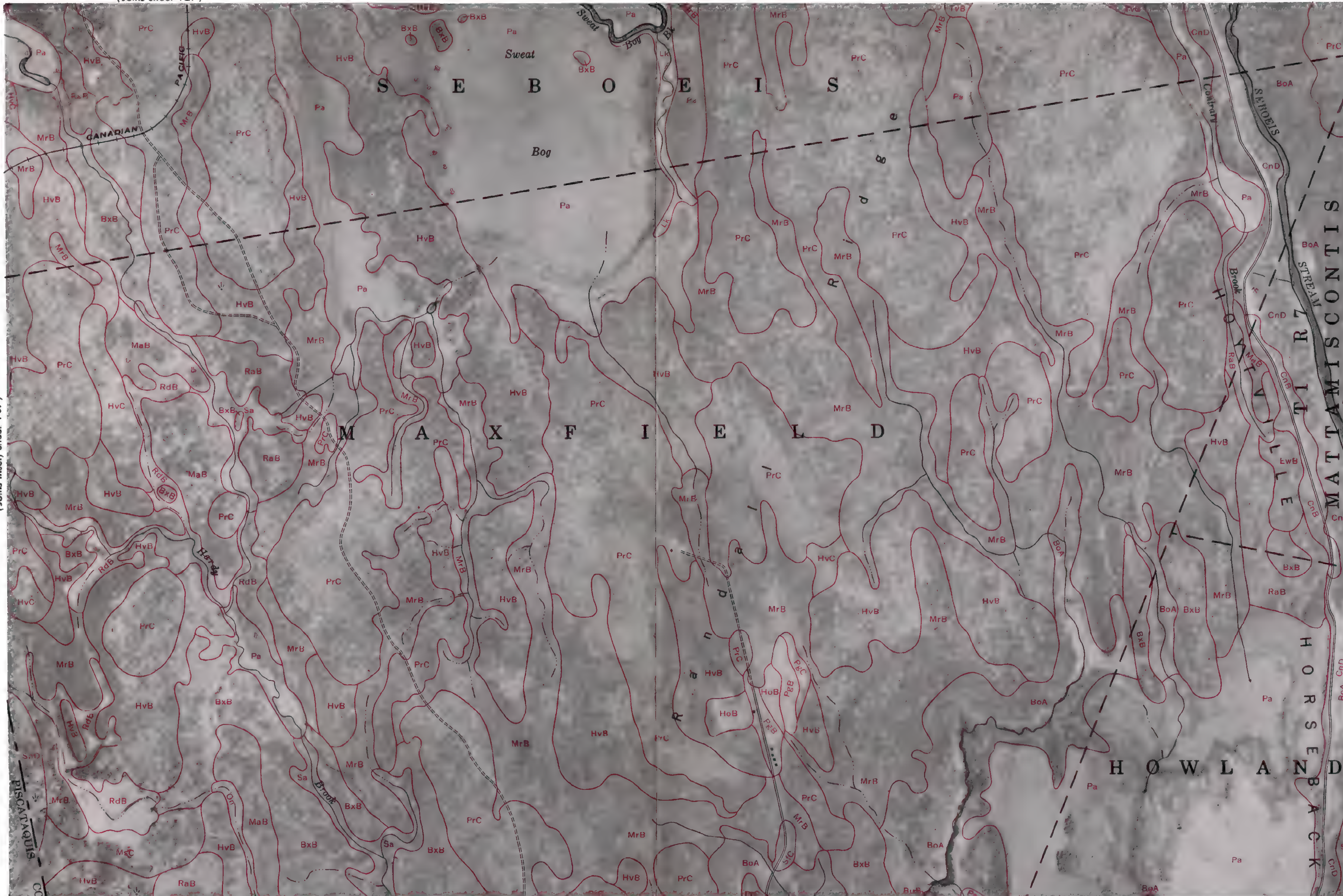
0 ½ 1 Mile Scale 1:20 000 0 5000 Feet

This map is one of a set compiled in 1962, as part of a soil survey by the Soil Conservation Service, United States Department of Agriculture, and the Maine Agricultural Experiment Station.

136

(Joins sheet 127)

N



(Joins inset, sheet 107)

(Joins sheet 137)

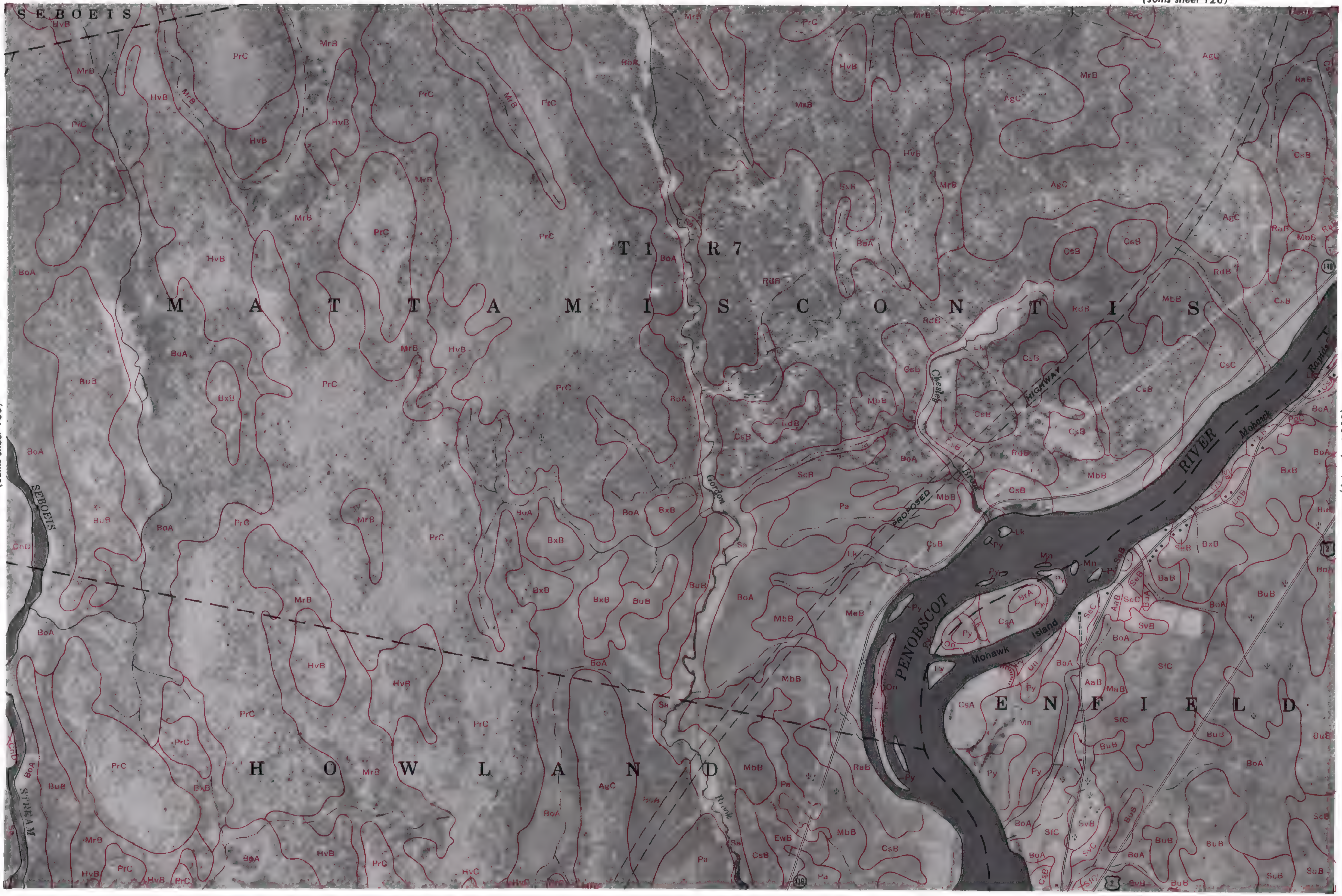
(Joins sheet 145)

0 ½ 1 Mile Scale 1:20 000 0 5000 Feet

(Joins sheet 128)

137

(Joins sheet 136)



(Joins sheet 138)

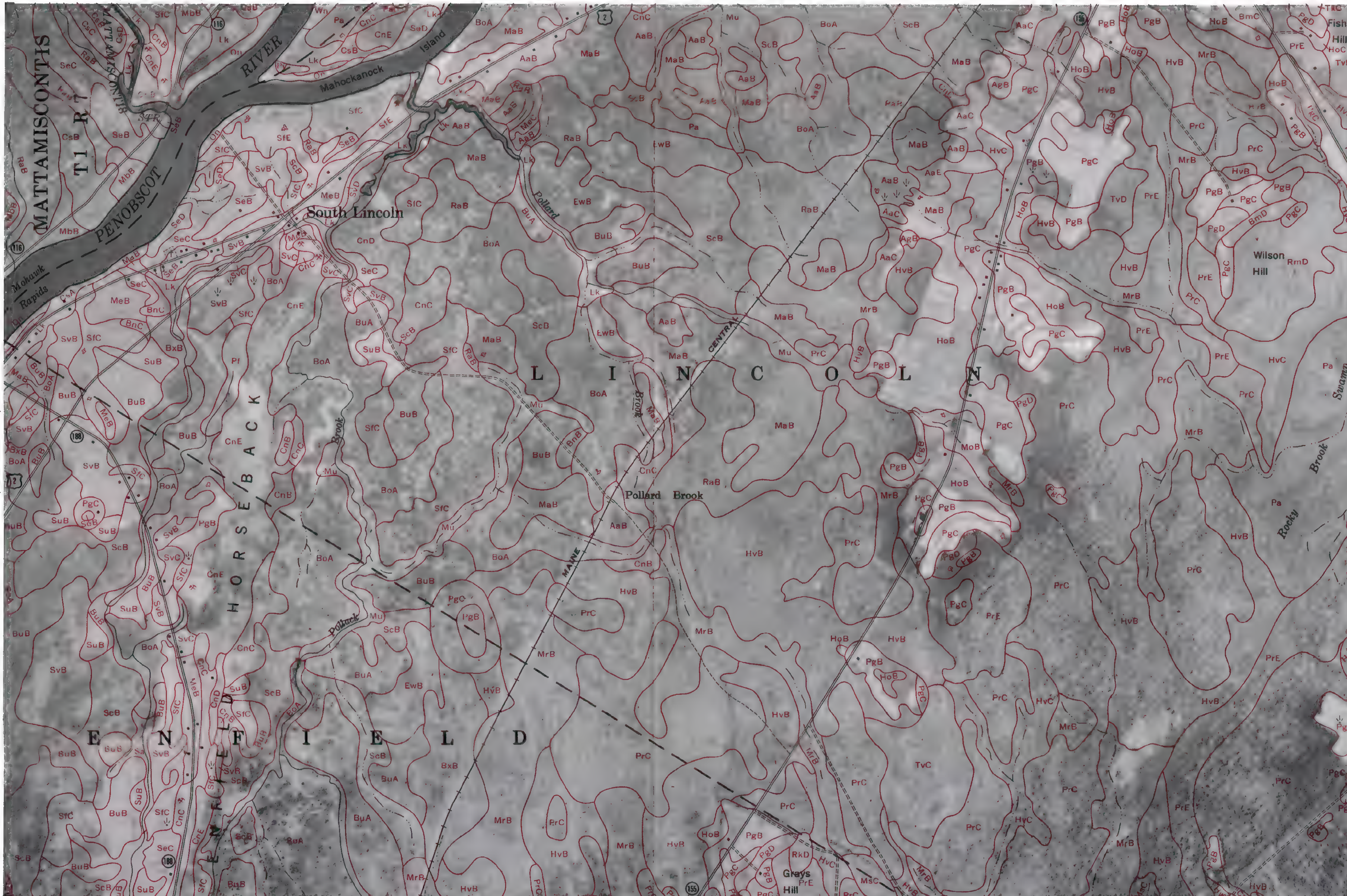
(Joins sheet 146)

0 ½ 1 Mile Scale 1:20 000 0 5000 Feet

This map is one of a set compiled in 1962, as part of a soil survey by the Soil Conservation Service, United States Department of Agriculture, and the Maine Agricultural Experiment Station.

138

(Joins sheet 129)



(Joins sheet 137)

(Joins sheet 139)

(Joins sheet 147)

0 ½ 1 Mile Scale 1:20 000 0 5000 Feet

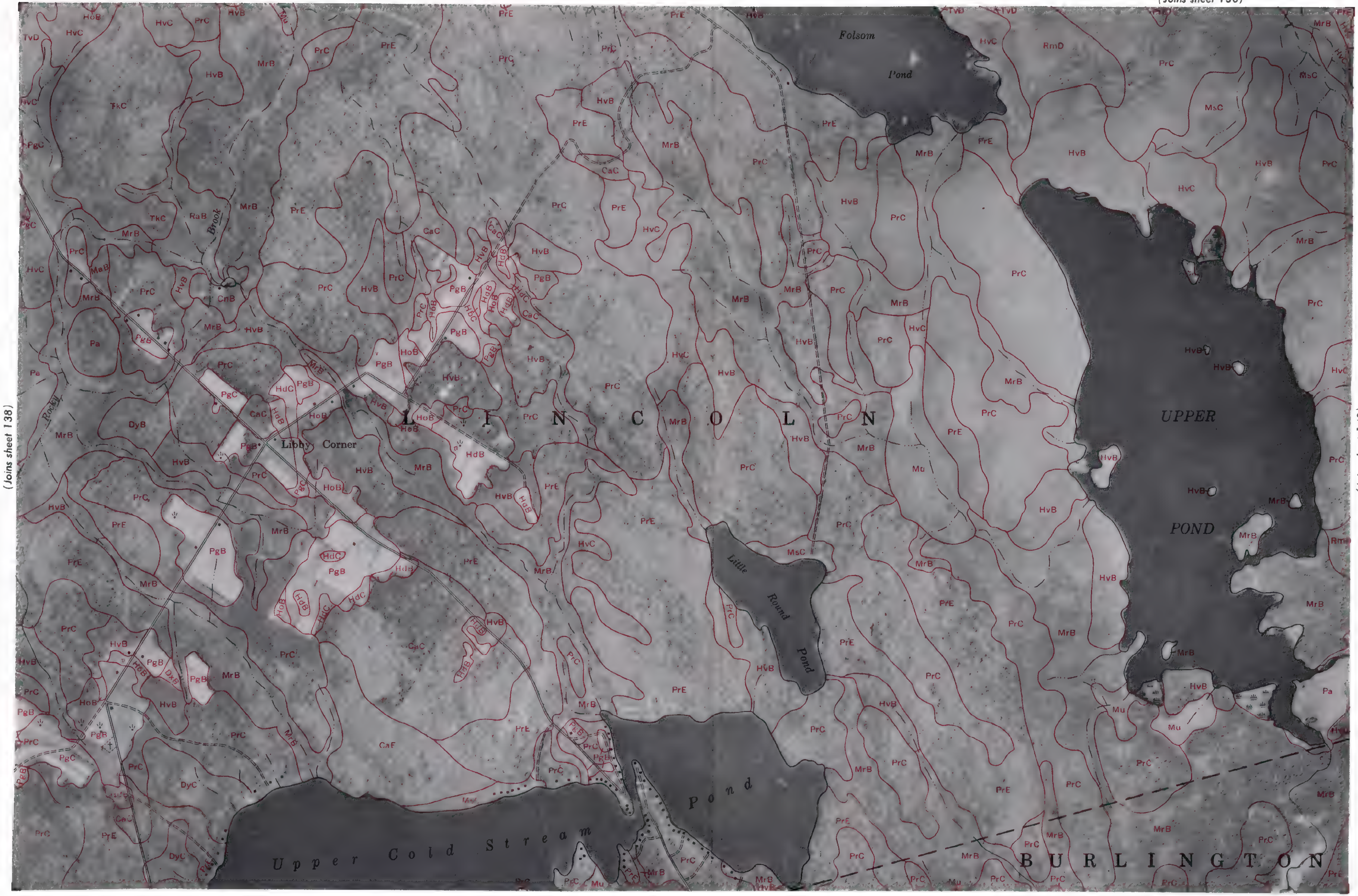
(Joins sheet 130)

139

N

(Joins sheet 138)

(Joins sheet 140)



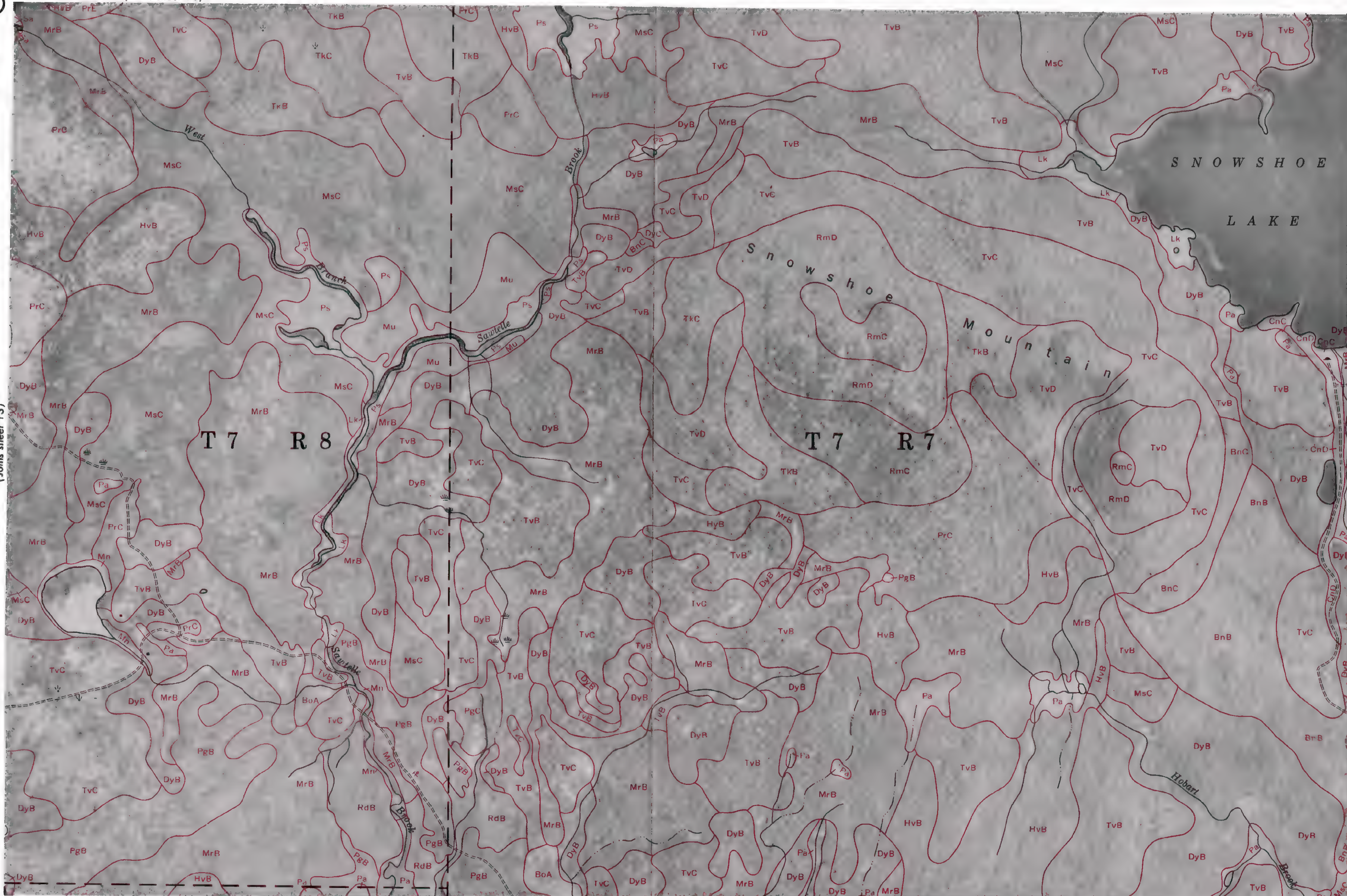
(Joins sheet 148)

0 ½ 1 Mile Scale 1:20 000 0 5000 Feet

This map is one of a set compiled in 1962, as part of a soil survey by the Soil Conservation Service, United States Department of Agriculture, and the Maine Agricultural Experiment Station.

14

(Joins sheet 10)



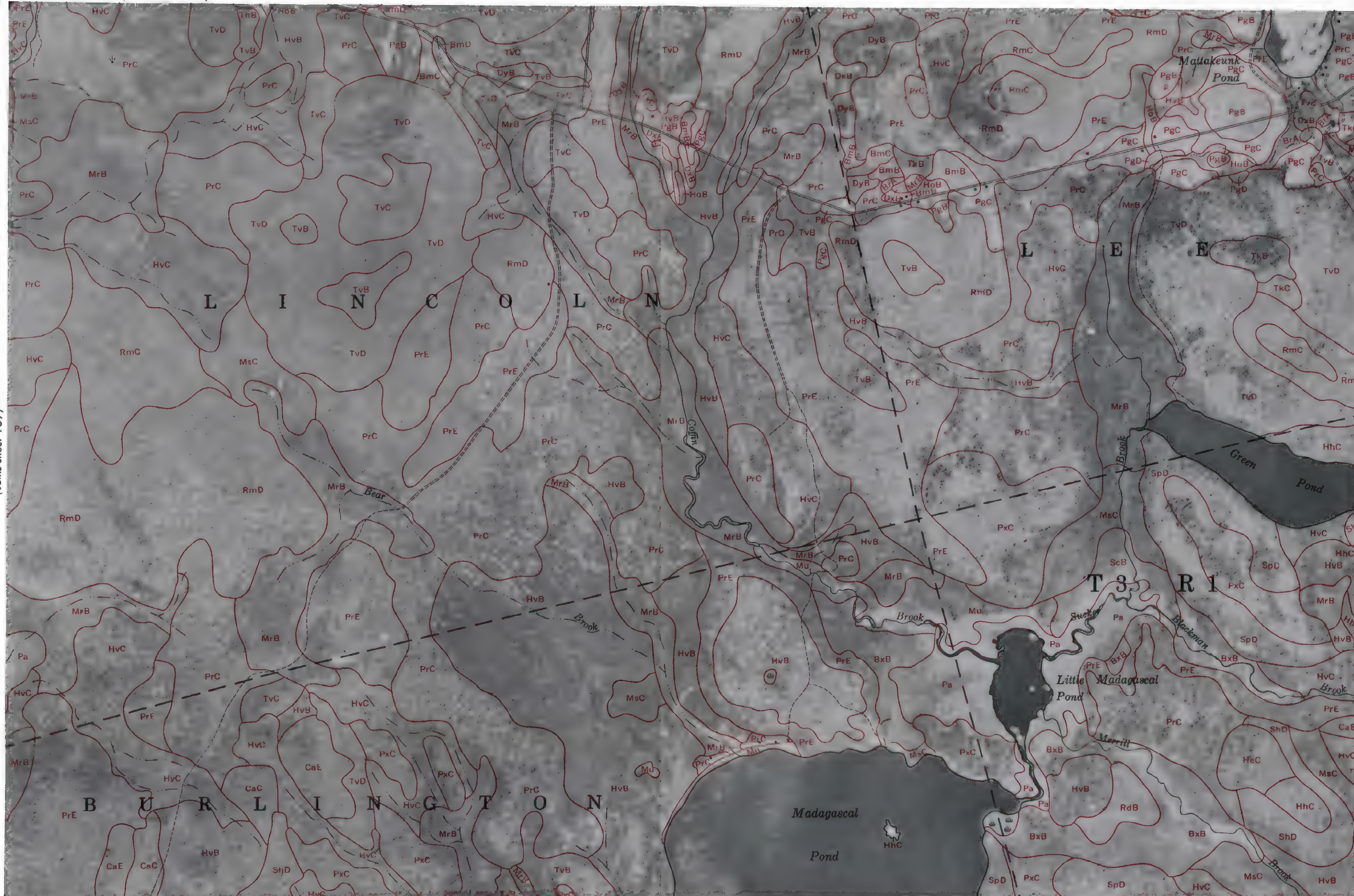
(Joins sheet 18)

0 ½ 1 Mile Scale 1:20 000 0 5000 Feet

140

(Joins sheet 131)

(Joins sheet 139)



(Joins sheet 141)

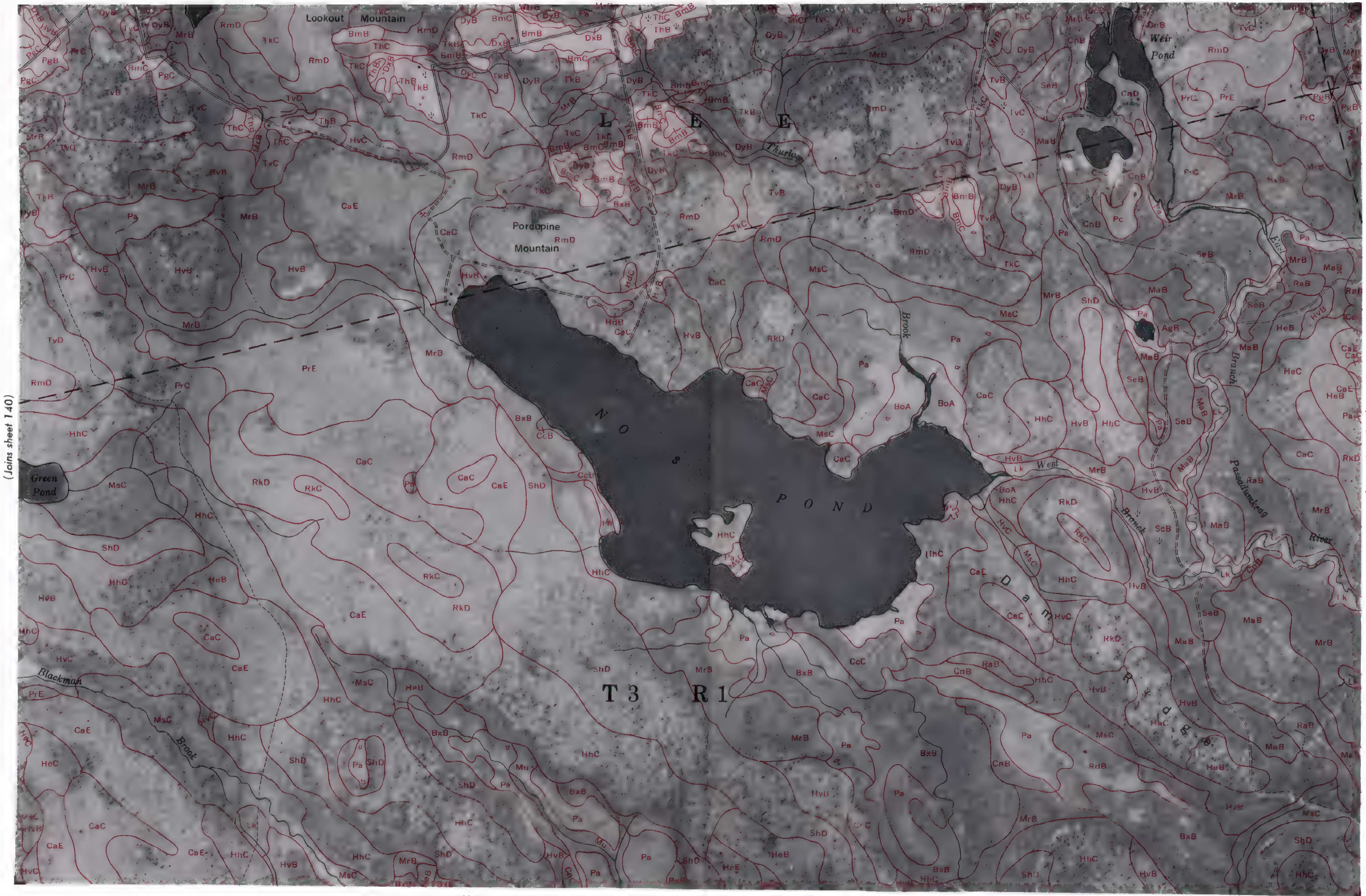
(Joins sheet 149)

0 ½ 1 Mile Scale 1:20 000 0 5000 Feet

(Joins sheet 132)

141

(Joins sheet 140)

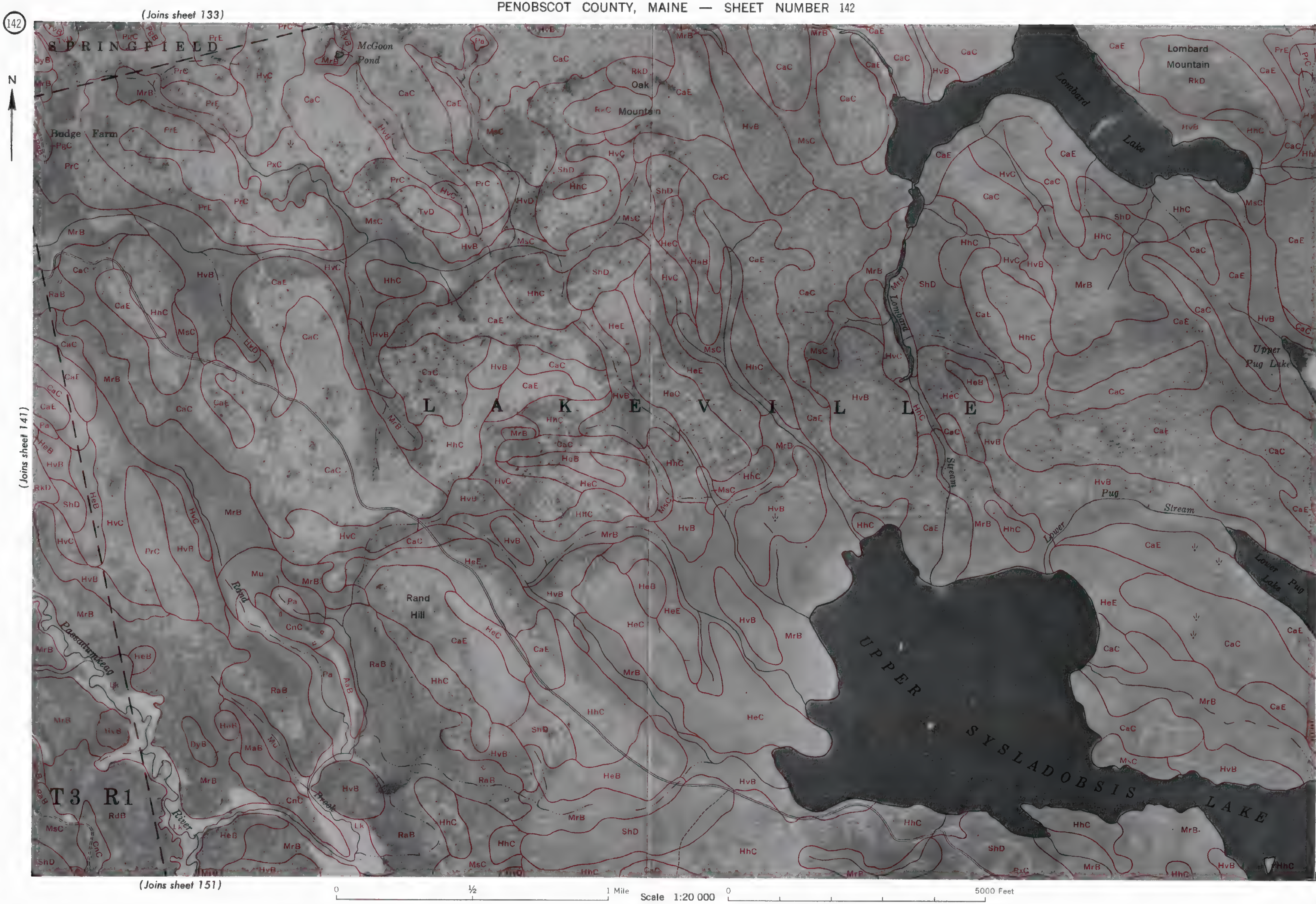


(Joins sheet 142)

0 ½ 1 Mile Scale 1:20 000 0 5000 Feet

(Joins sheet 150)

This map is one of a set compiled in 1962, as part of a soil survey by the Soil Conservation Service, United States Department of Agriculture, and the Maine Agricultural Experiment Station.


142
(Joins sheet 133)
(Joins sheet 141)
(Joins sheet 143)
(Joins sheet 151)
N
SPRINGFIELD
McGoon Pond
Budge Farm
Oak Mountain
Lombard Mountain
Lombard Lake
Lombard Stream
Upper Pug Lake
Lower Pug Lake
Lower Pug Stream
LAKEVILLE
Rand Hill
Passadumkeag River
Pond Brook
UPPER SYSLADOBSIS LAKE
T3 R1
0
½
1 Mile
Scale 1:20 000
0
5000 Feet

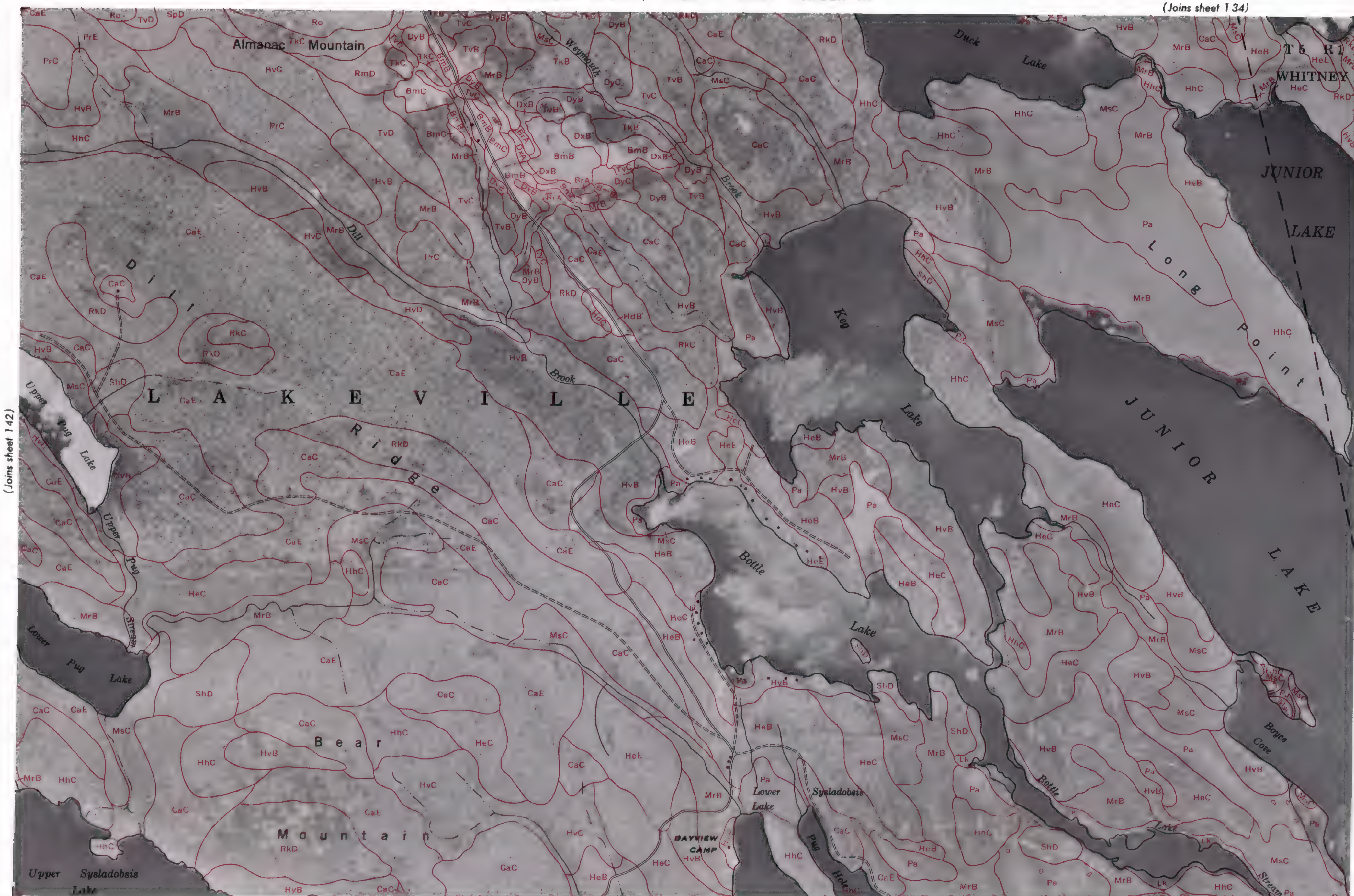
(Joins sheet 134)

143

N

(Joins sheet 142)

(Joins sheet 144)



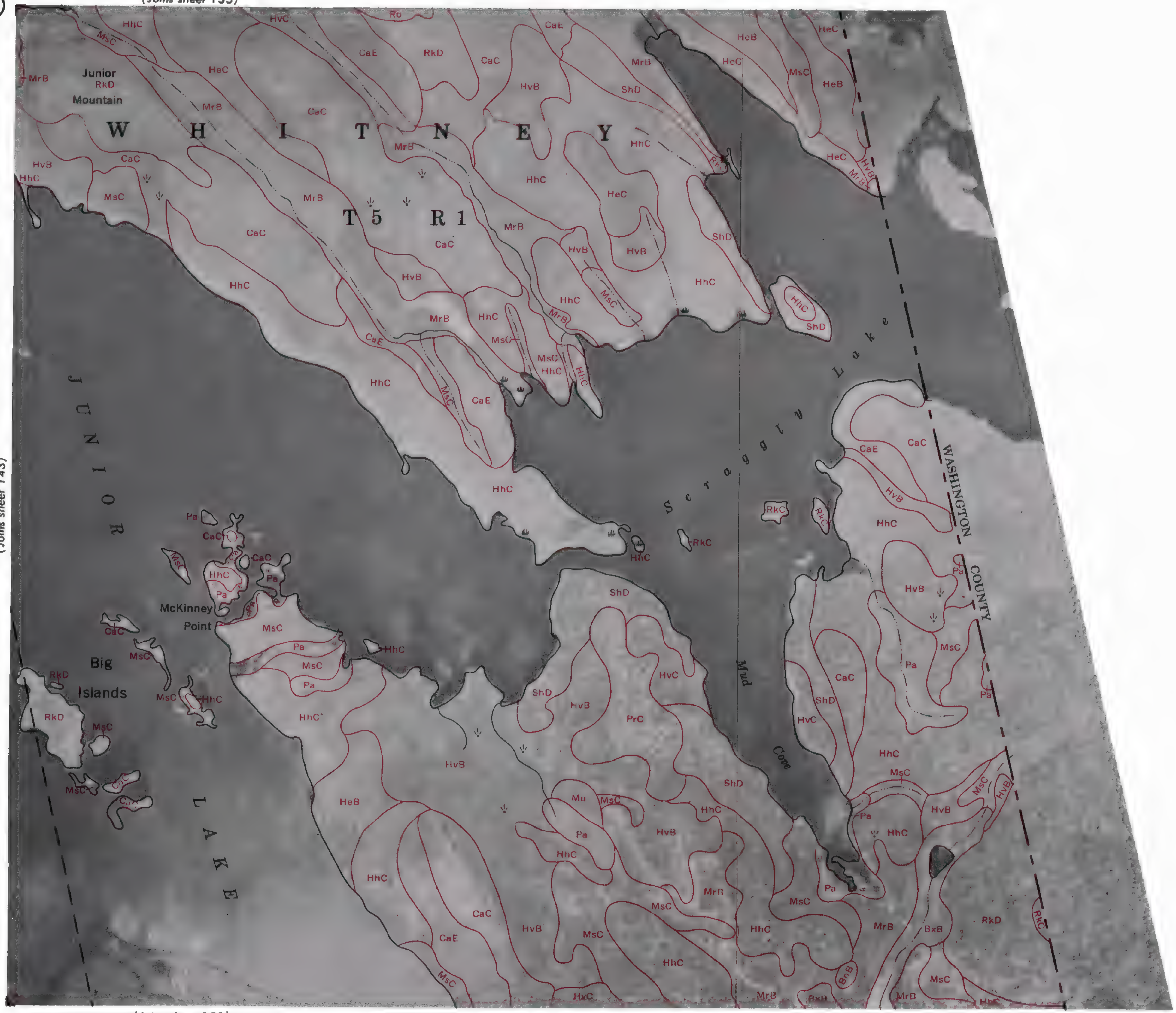
0 ½ 1 Mile Scale 1:20 000 0 5000 Feet

(Joins sheet 152)

This map is one of a set compiled in 1962, as part of a soil survey by the Soil Conservation Service, United States Department of Agriculture, and the Maine Agricultural Experiment Station.

(Joins sheet 135)

(Joins sheet 143)

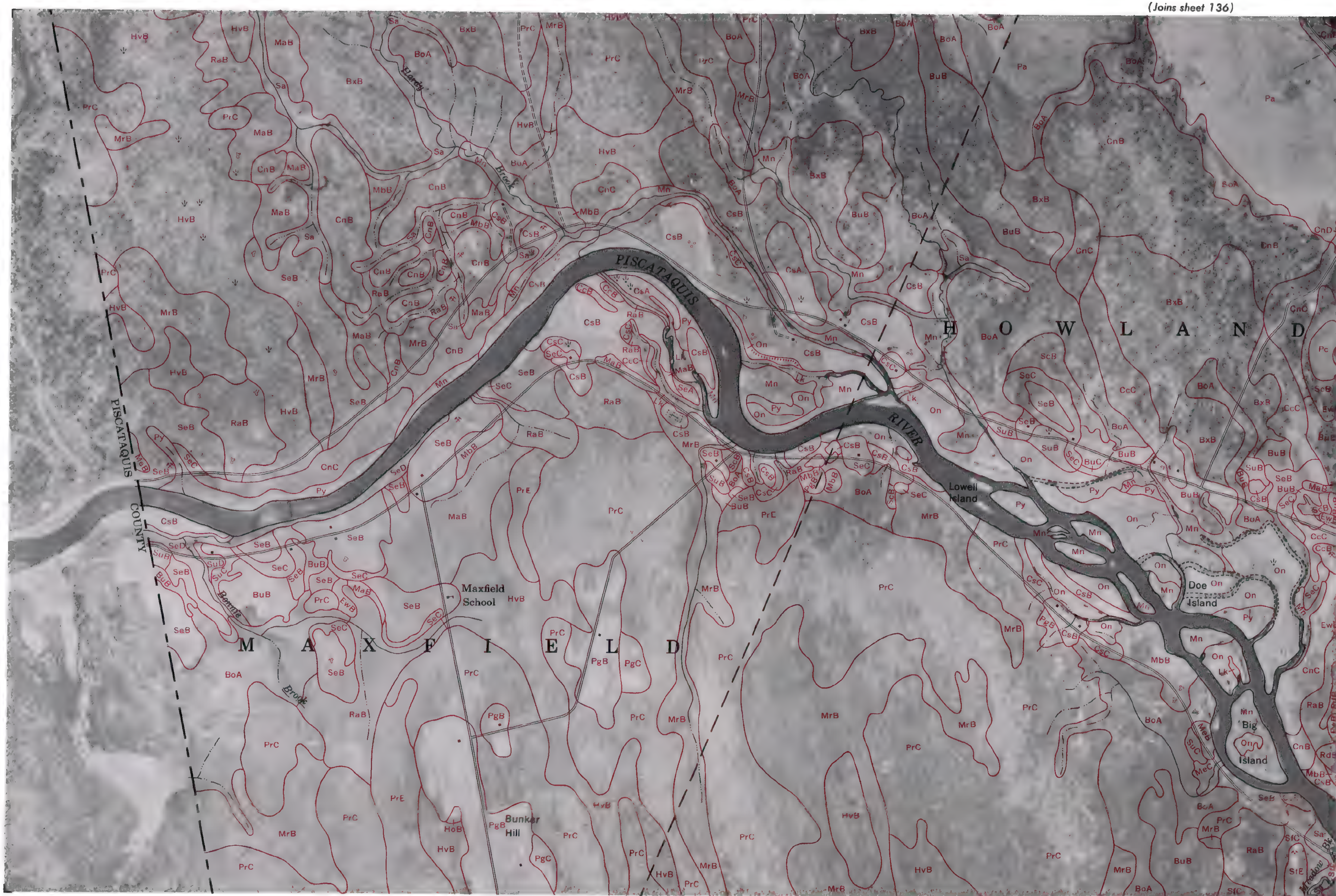


(Joins sheet 153)

0 ½ 1 Mile Scale 1:20 000 0 5000 Feet

(Joins sheet 136)

145



(Joins sheet 146)

(Joins sheet 155)

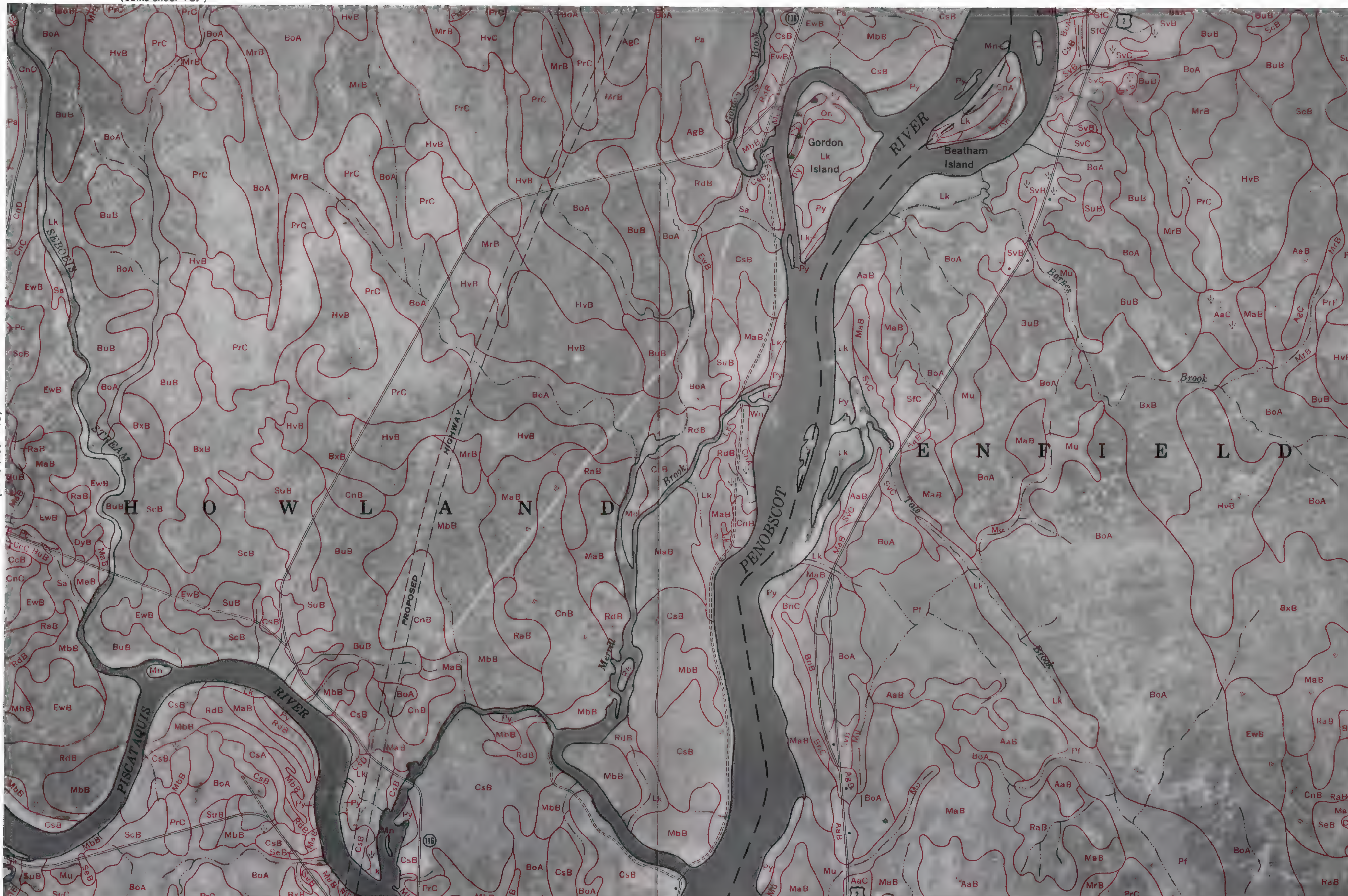
0 ½ 1 Mile Scale 1:20 000 0 5000 Feet

This map is one of a set compiled in 1962, as part of a soil survey by the Soil Conservation Service, United States Department of Agriculture, and the Maine Agricultural Experiment Station.

146

(Joins sheet 137)

(Joins sheet 145)



(Joins sheet 147)

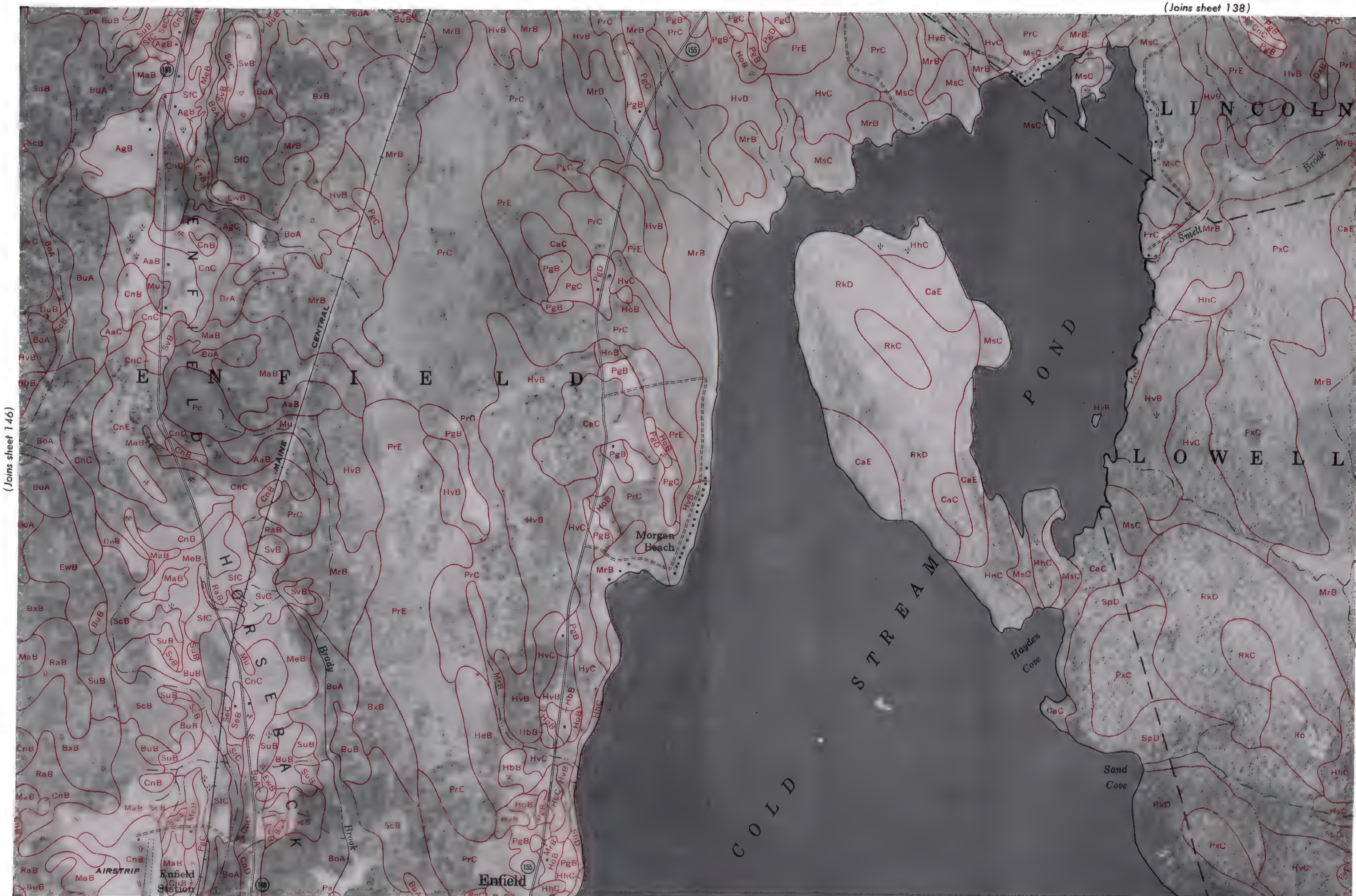
(Joins sheet 156)

0 ½ 1 Mile Scale 1:20 000 0 5000 Feet

(Joins sheet 138)

147

(Joins sheet 146)



(Joins sheet 148)

0 ½ 1 Mile Scale 1:20 000 0 5000 Feet

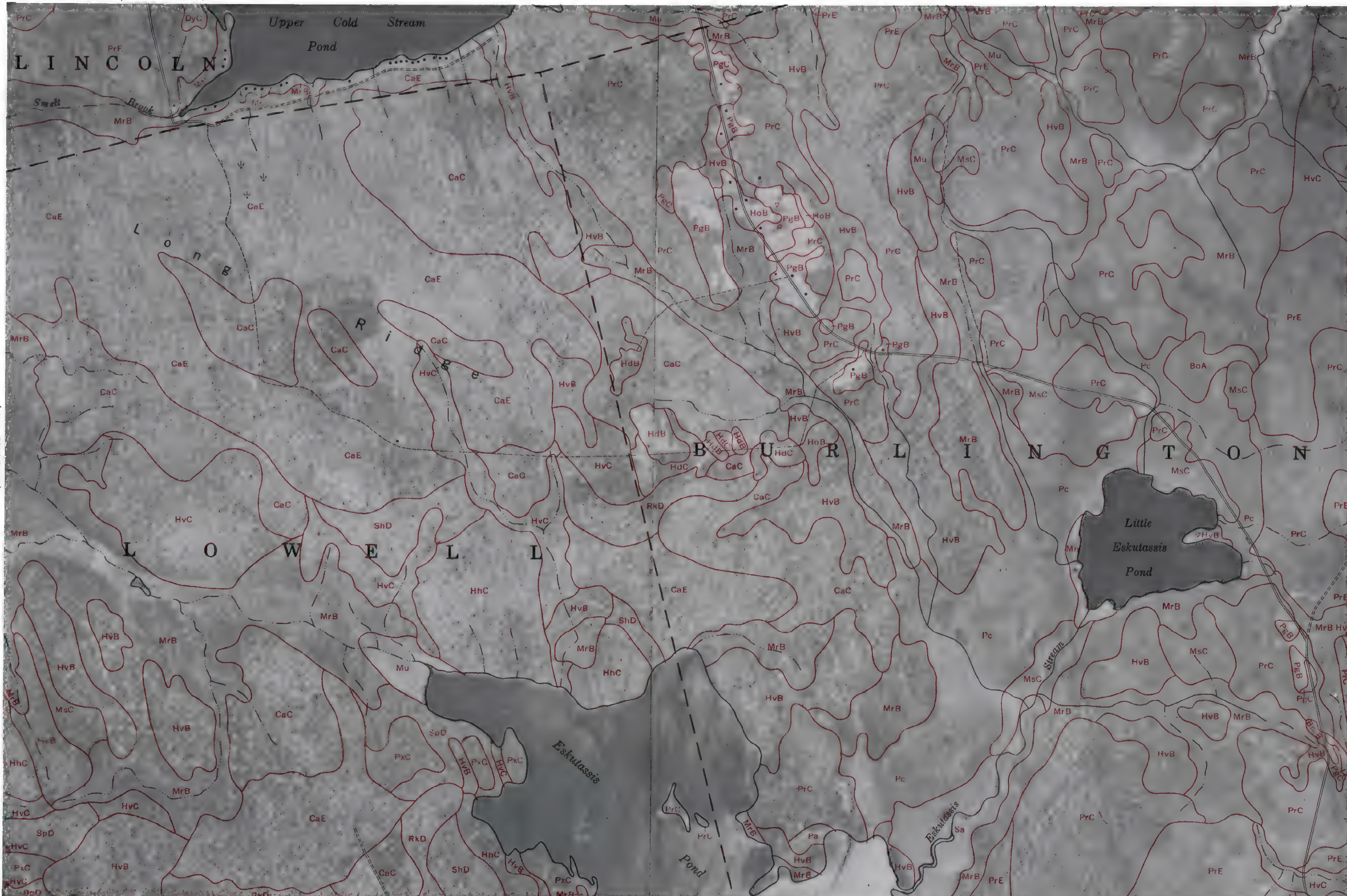
(Joins sheet 157)

This map is one of a set compiled in 1962, as part of a soil survey by the Soil Conservation Service, United States Department of Agriculture, and the Maine Agricultural Experiment Station.

(Joins sheet 139)

N

(Joins sheet 147)



(Joins sheet 149)

(Joins sheet 158)

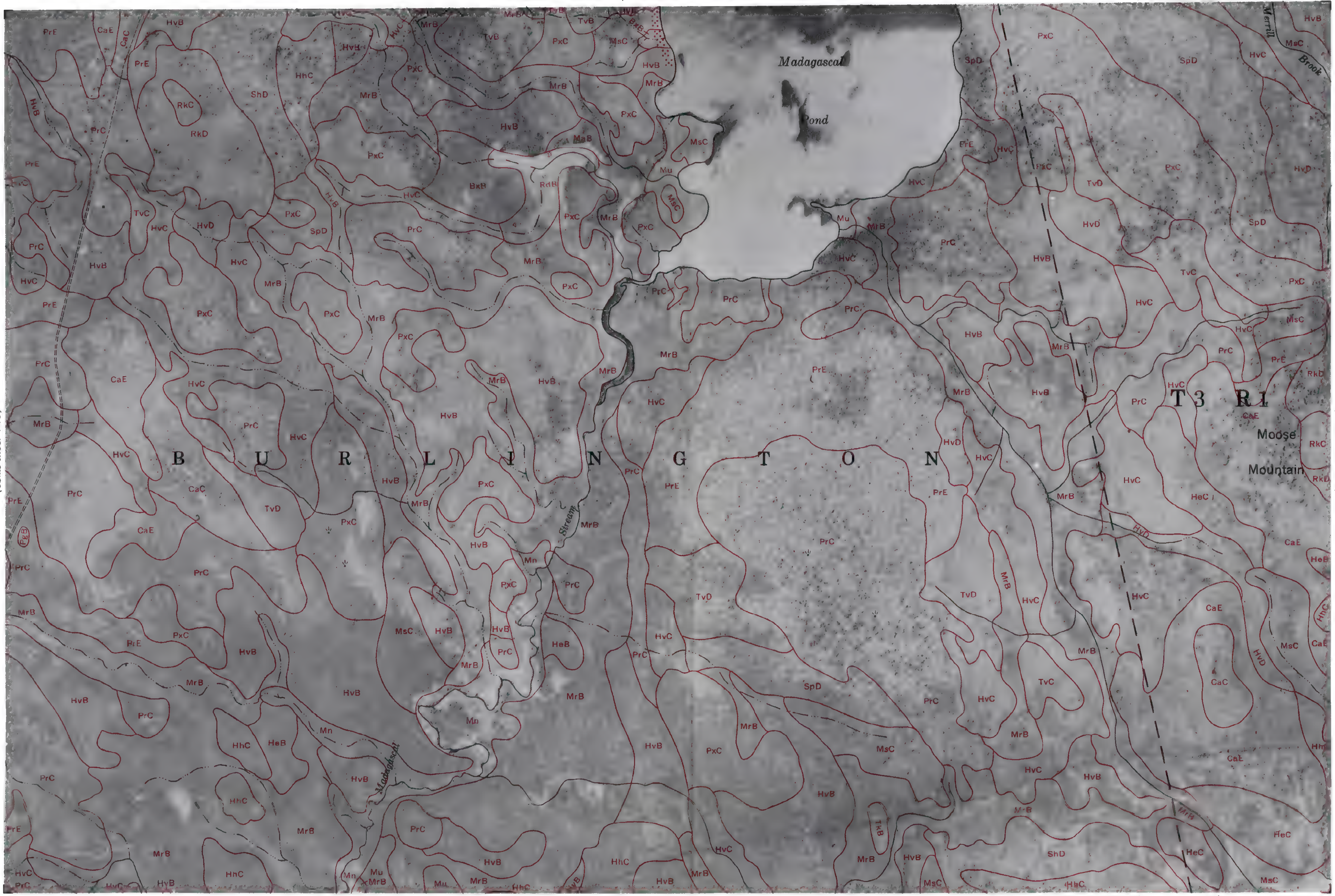
0 ½ 1 Mile Scale 1:20 000 0 5000 Feet

(Joins sheet 140)

149

N

(Joins sheet 148)



(Joins sheet 150)

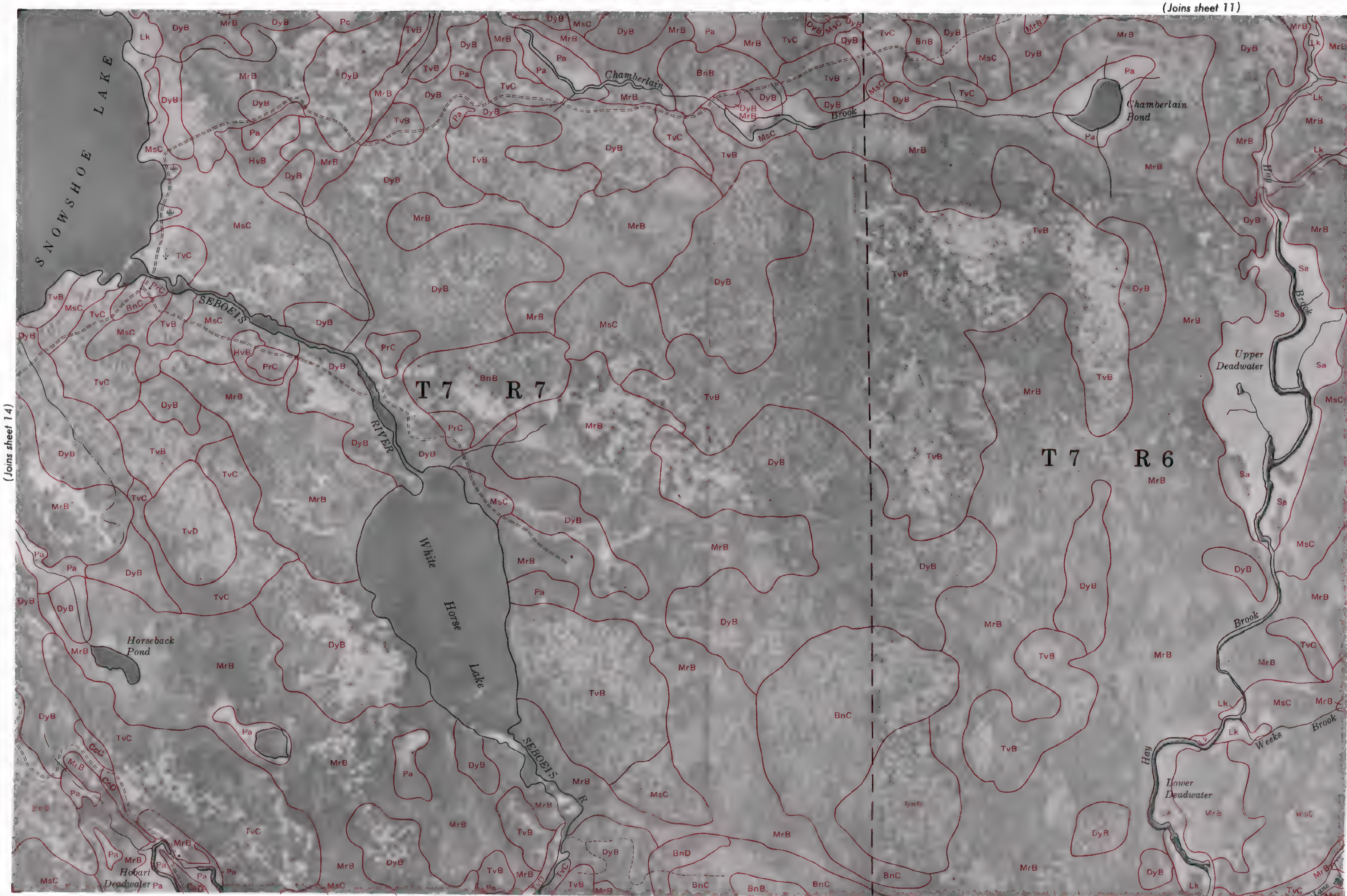
This map is one of a set compiled in 1962, as part of a soil survey by the Soil Conservation Service, United States Department of Agriculture, and the Maine Agricultural Experiment Station.

0 ½ 1 Mile Scale 1:20 000 0 5000 Feet

(Joins sheet 159)

(Joins sheet 11)

15



(Joins sheet 14)

(Joins sheet 16)

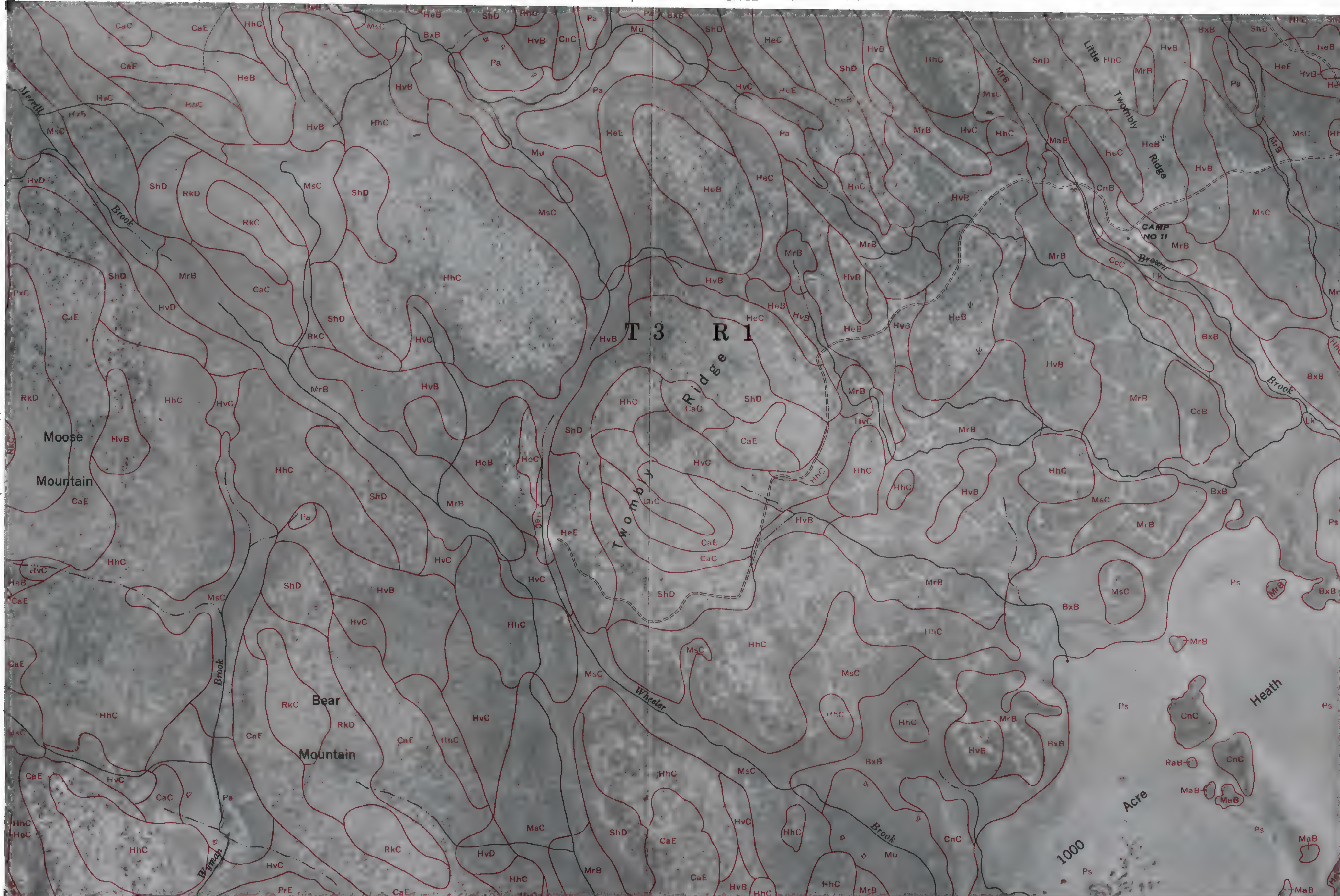
This map is one of a set compiled in 1962, as part of a soil survey by the Soil Conservation Service, United States Department of Agriculture, and the Maine Agricultural Experiment Station.

0 ½ 1 Mile Scale 1:20 000 0 5000 Feet

(Joins sheet 19)

N

(Joins sheet 149)



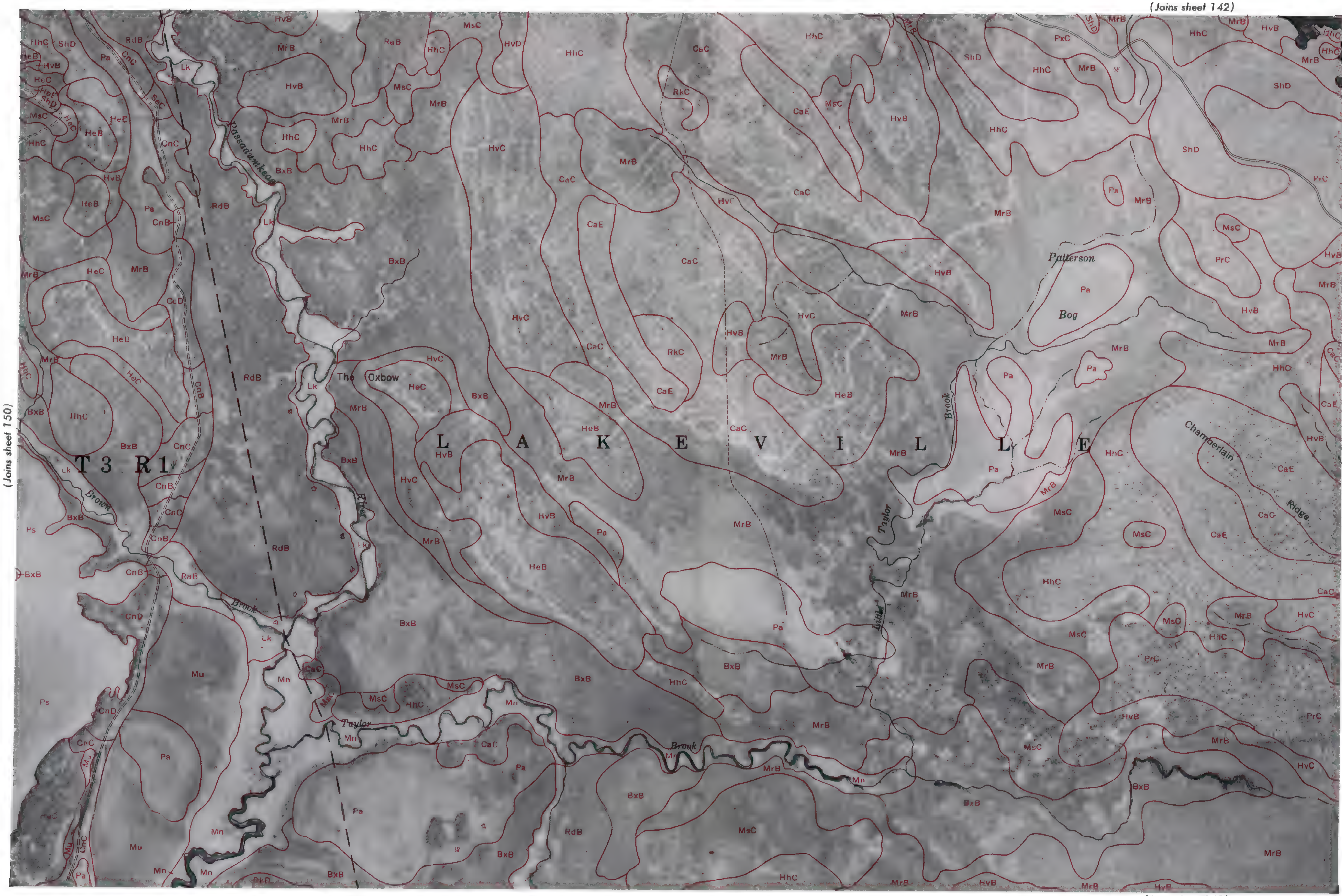
(Joins sheet 151)

(Joins sheet 160)

0 ½ 1 Mile Scale 1:20 000 0 5000 Feet

(Joins sheet 142)

(Joins sheet 150)



(Joins sheet 152)

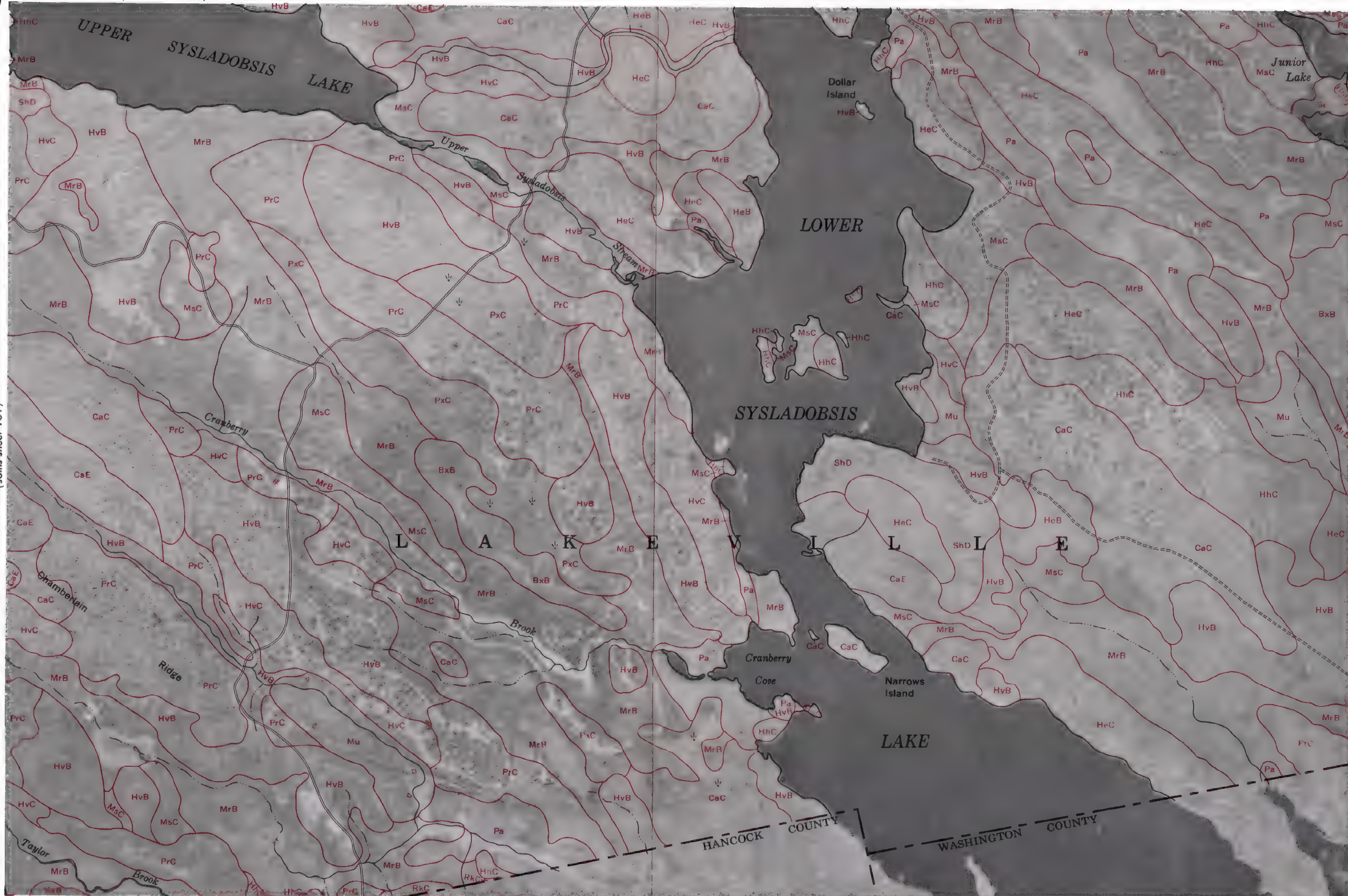
(Joins sheet 161)

0 ½ 1 Mile Scale 1:20 000 0 5000 Feet

This map is one of a set compiled in 1962, as part of a soil survey by the Soil Conservation Service, United States Department of Agriculture, and the Maine Agricultural Experiment Station.

(152)

(Joins sheet 143)



(Joins sheet 151)

(Joins sheet 153)

(Joins inset, sheet 160)

Scale 1:20 000

0 ½ 1 Mile

0 5000 Feet

(153)

(Joins sheet 144)

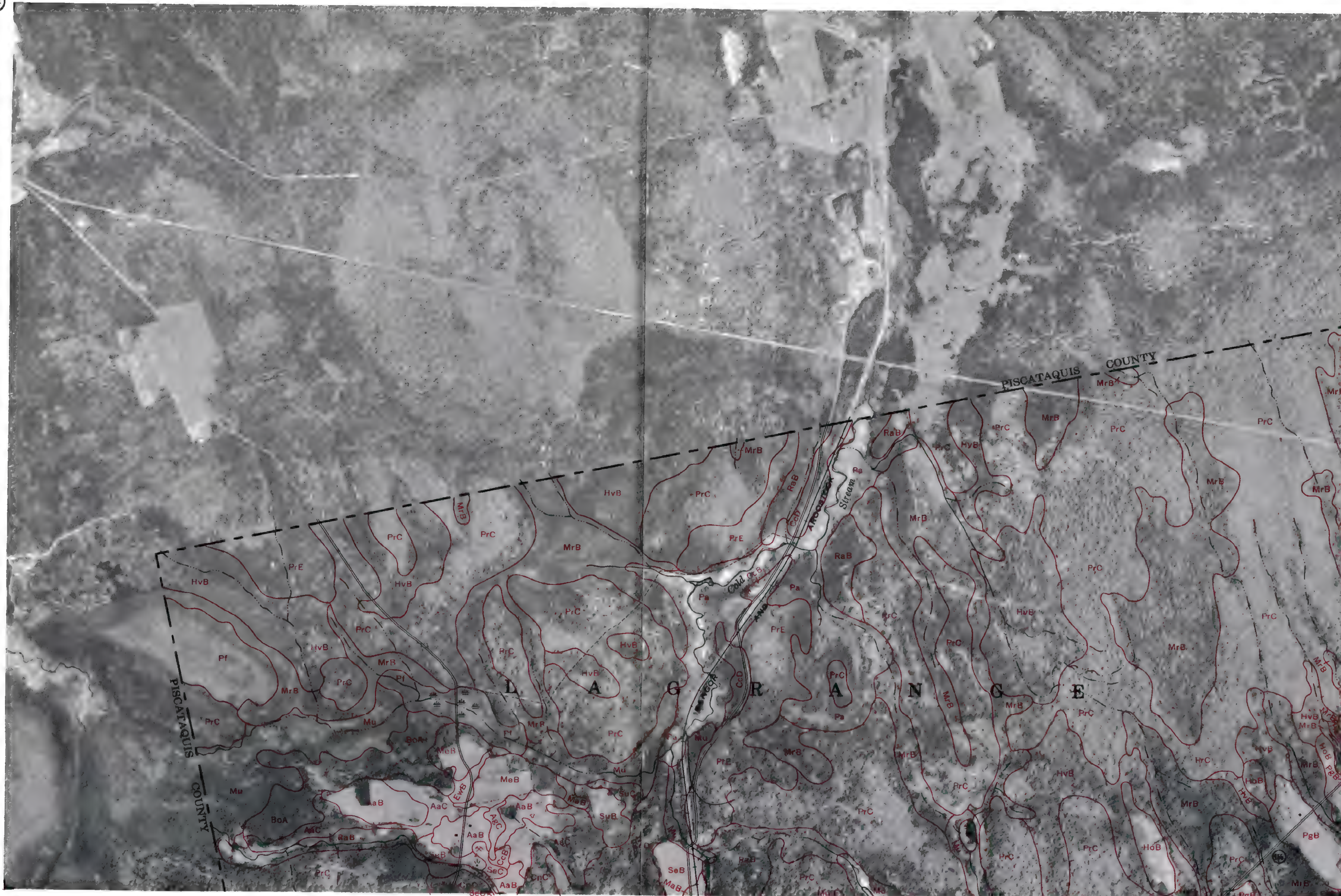
(Joins sheet 152)

N

0 ½ 1 Mile Scale 1:20 000 0 5000 Feet

This map is one of a set compiled in 1962, as part of a soil survey by the Soil Conservation Service, United States Department of Agriculture, and the Maine Agricultural Experiment Station.

N



(Joins sheet 155)

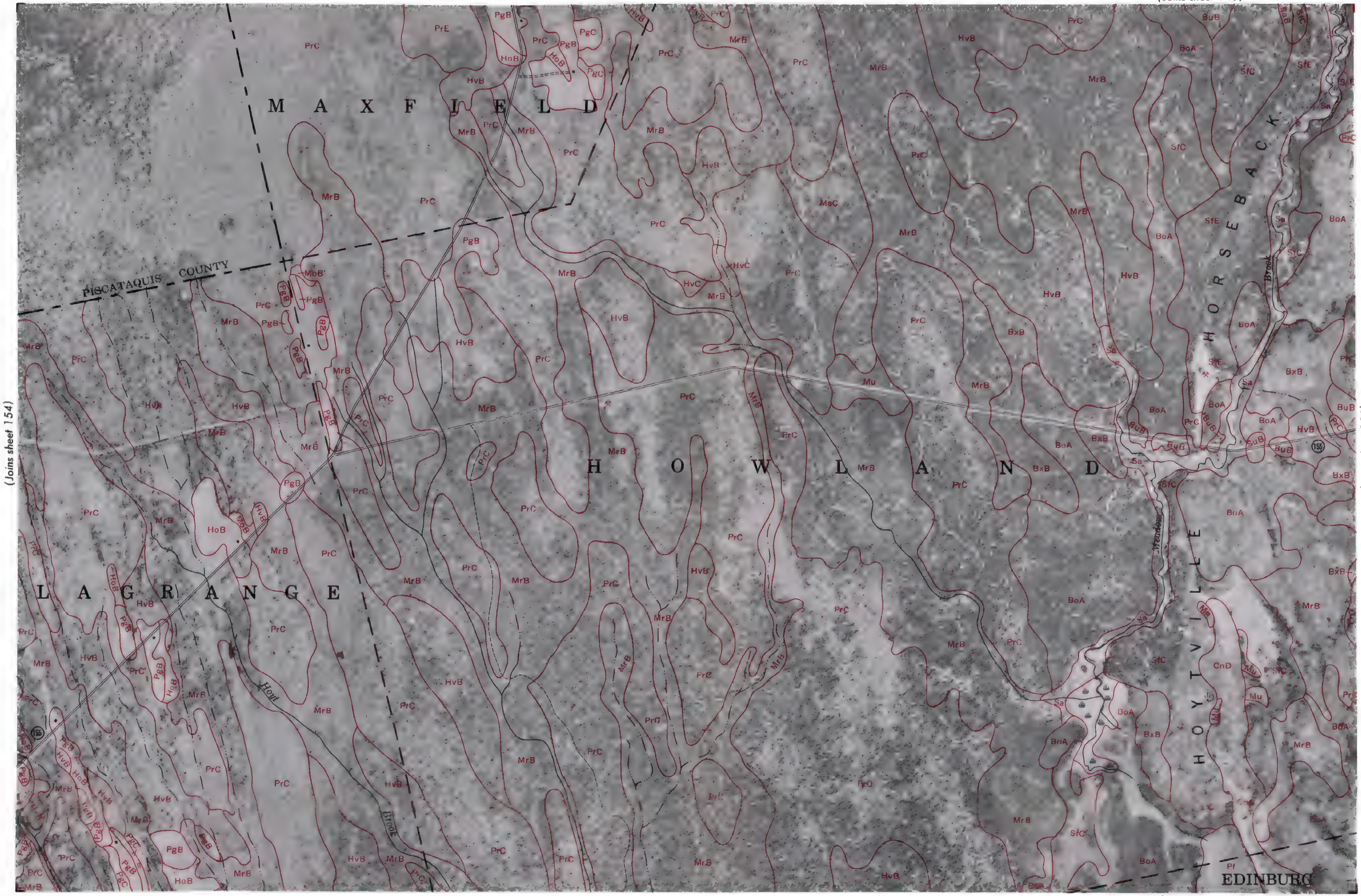
0 ½ 1 Mile Scale 1:20 000 0 5000 Feet

(Joins sheet 162)

155

(Joins sheet 145)

(Joins sheet 154)



(Joins sheet 156)

(Joins sheet 163)

0 ½ 1 Mile Scale 1:20 000 0 5000 Feet

This map is one of a set compiled in 1962, as part of a soil survey by the Soil Conservation Service, United States Department of Agriculture, and the Maine Agricultural Experiment Station.

(Joins sheet 146)

N

(Joins sheet 155)

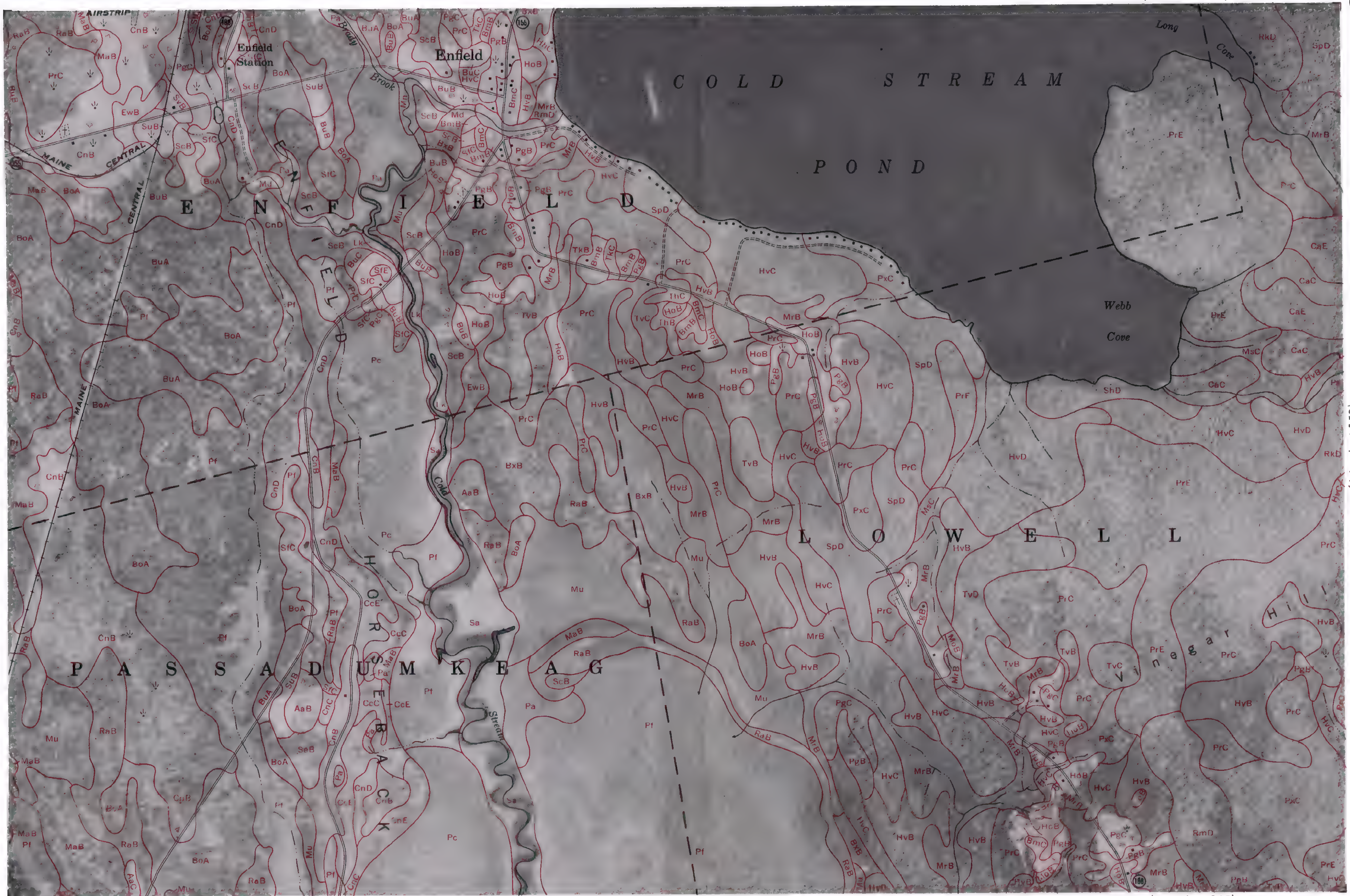
(Joins sheet 157)

(Joins sheet 164)

0 ½ 1 Mile Scale 1:20 000 0 5000 Feet

(Joins sheet 147)

157



(Joins sheet 156)

(Joins sheet 158)

(Joins sheet 165)

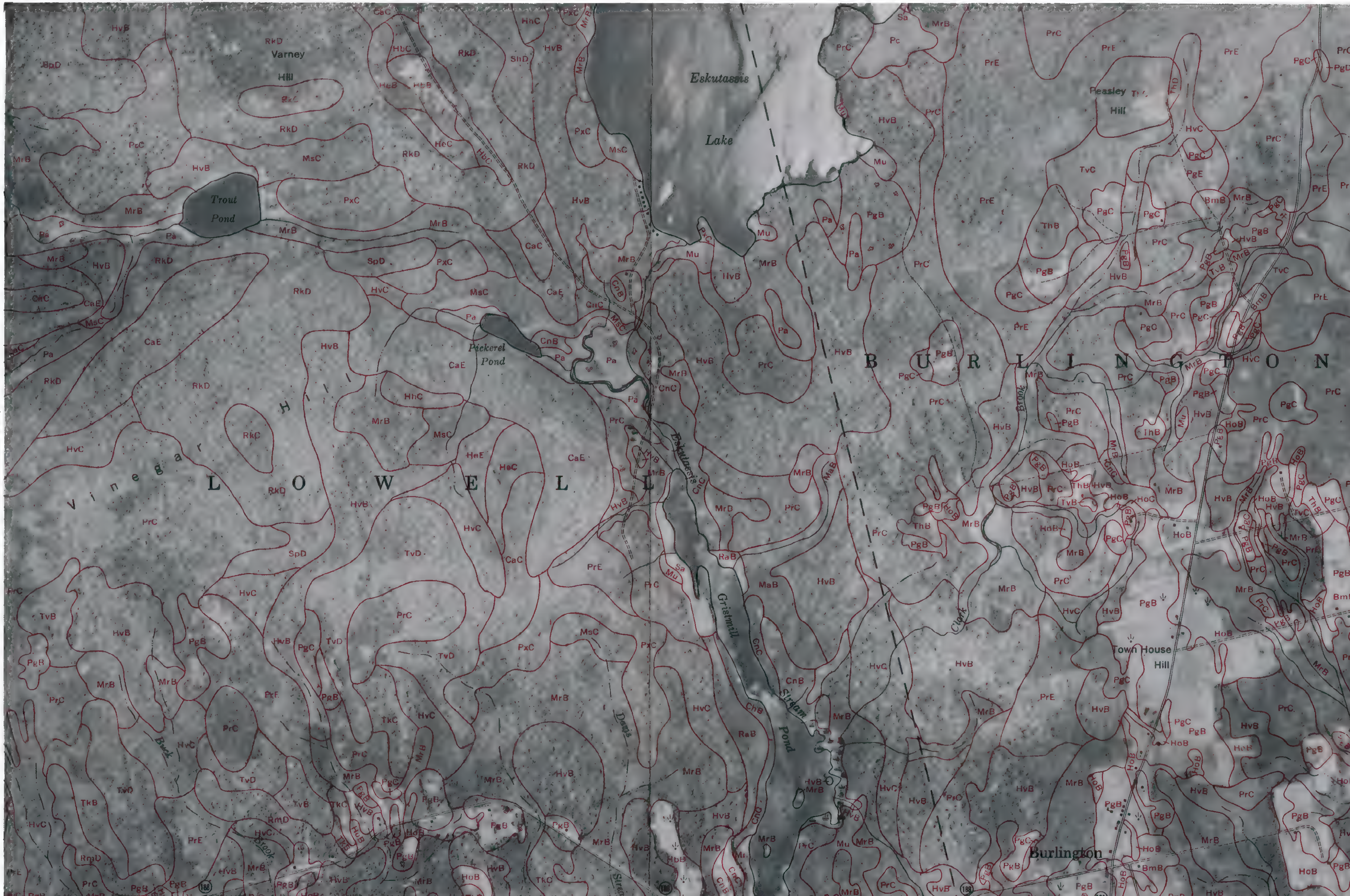
0 ½ 1 Mile Scale 1:20 000 0 5000 Feet

This map is one of a set compiled in 1962, as part of a soil survey by the Soil Conservation Service, United States Department of Agriculture, and the Maine Agricultural Experiment Station.

158

(Joins sheet 148)

(Joins sheet 157)



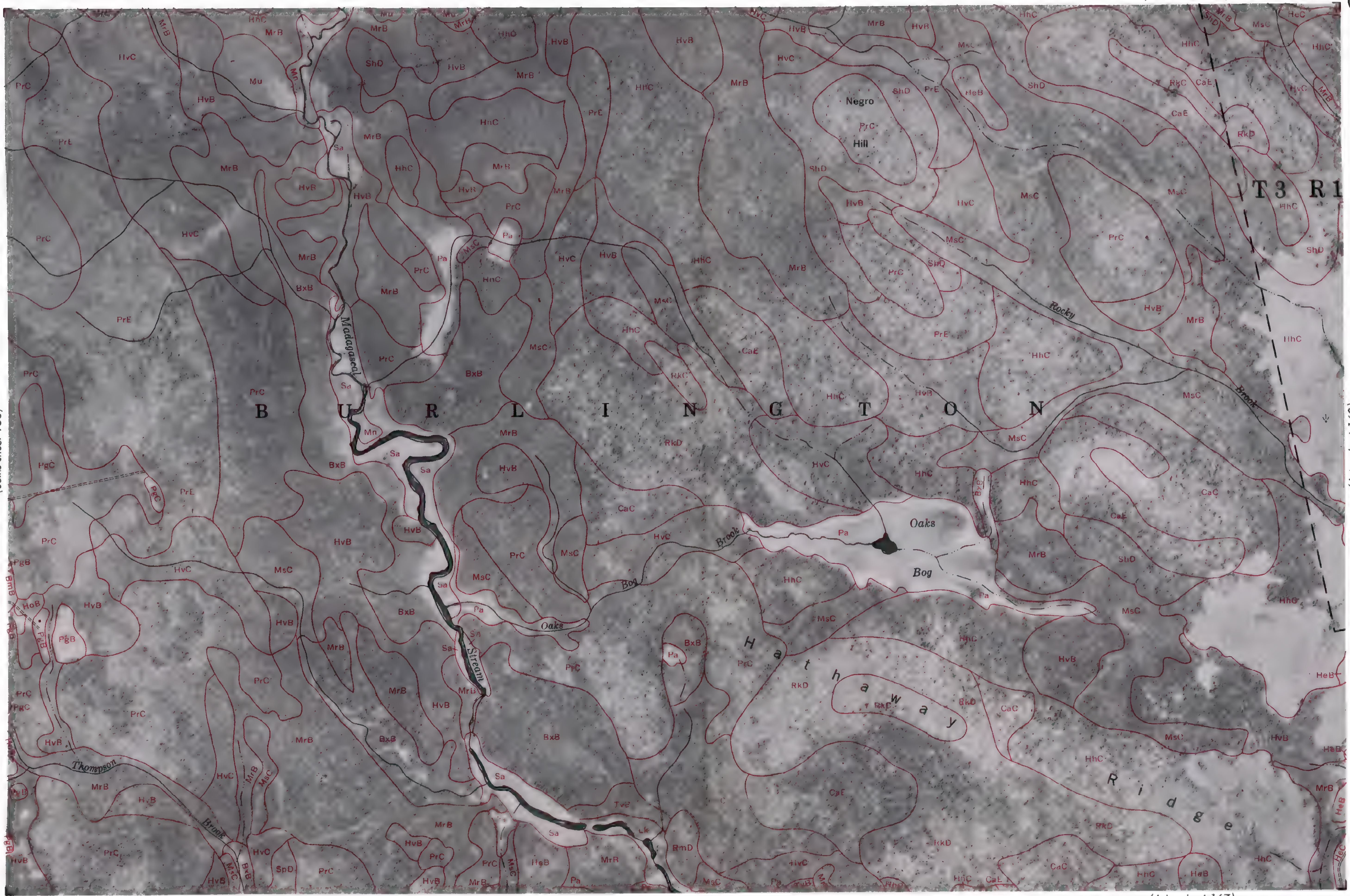
(Joins sheet 159)

(Joins sheet 166)

0 ½ 1 Mile Scale 1:20 000 0 5000 Feet

(Joins sheet 149)

159



(Joins sheet 158)

(Joins sheet 160)

(Joins sheet 167)

0 ½ 1 Mile Scale 1:20 000 0 5000 Feet

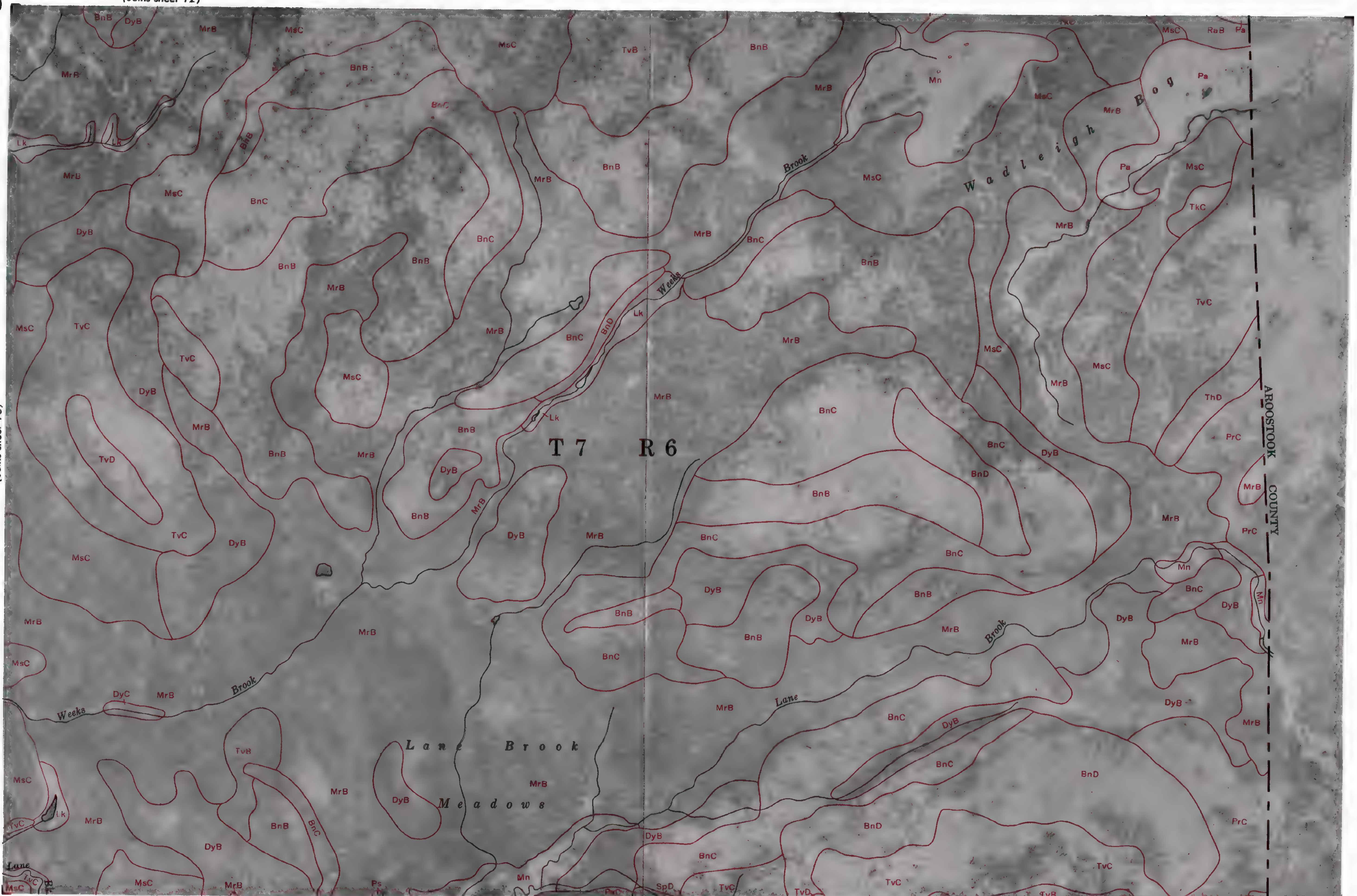
This map is one of a set compiled in 1962, as part of a soil survey by the Soil Conservation Service, United States Department of Agriculture, and the Maine Agricultural Experiment Station.

16

(Joins sheet 12)

N

(Joins sheet 15)



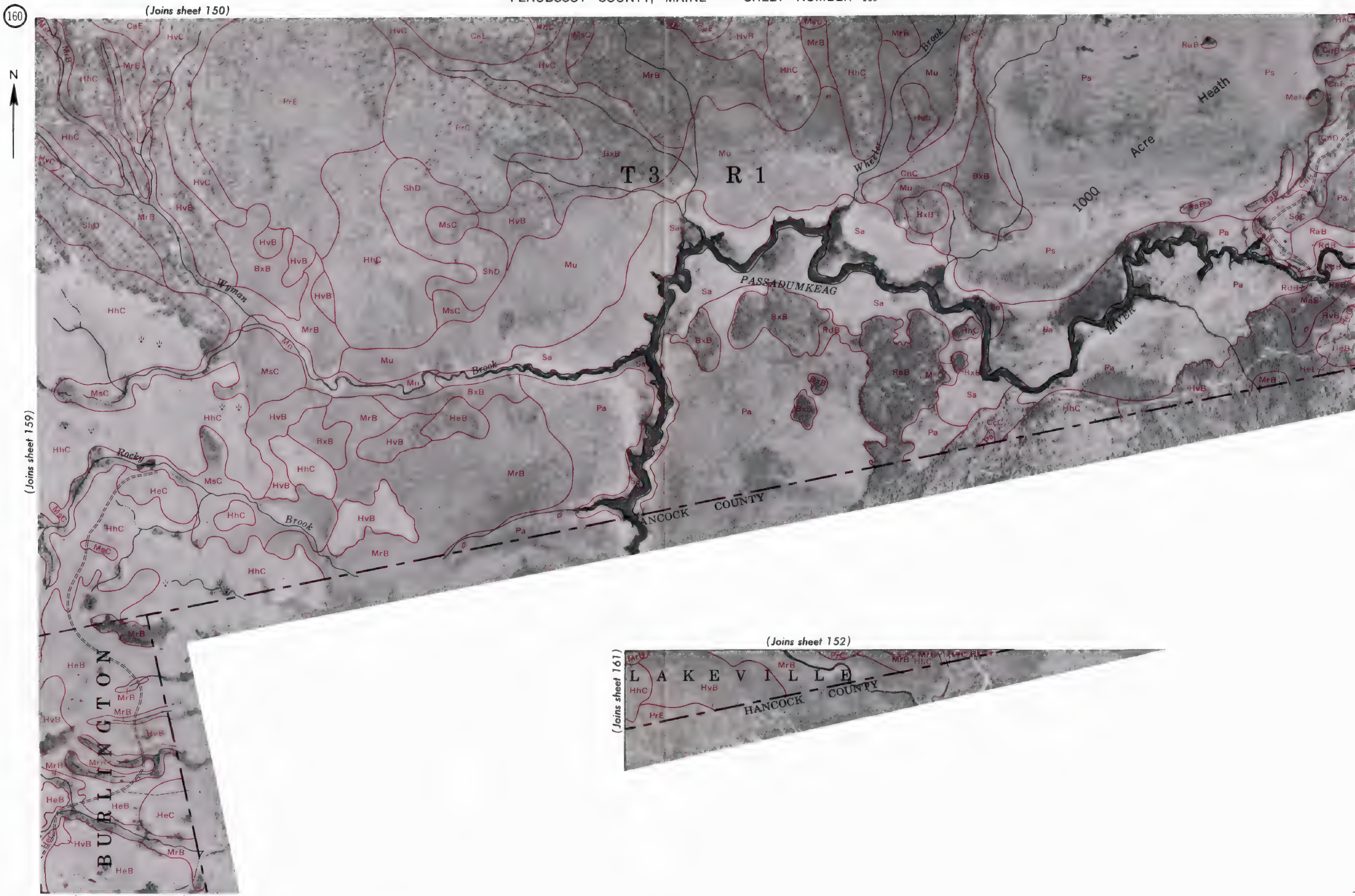
(Joins sheet 20)

0 ½ 1 Mile

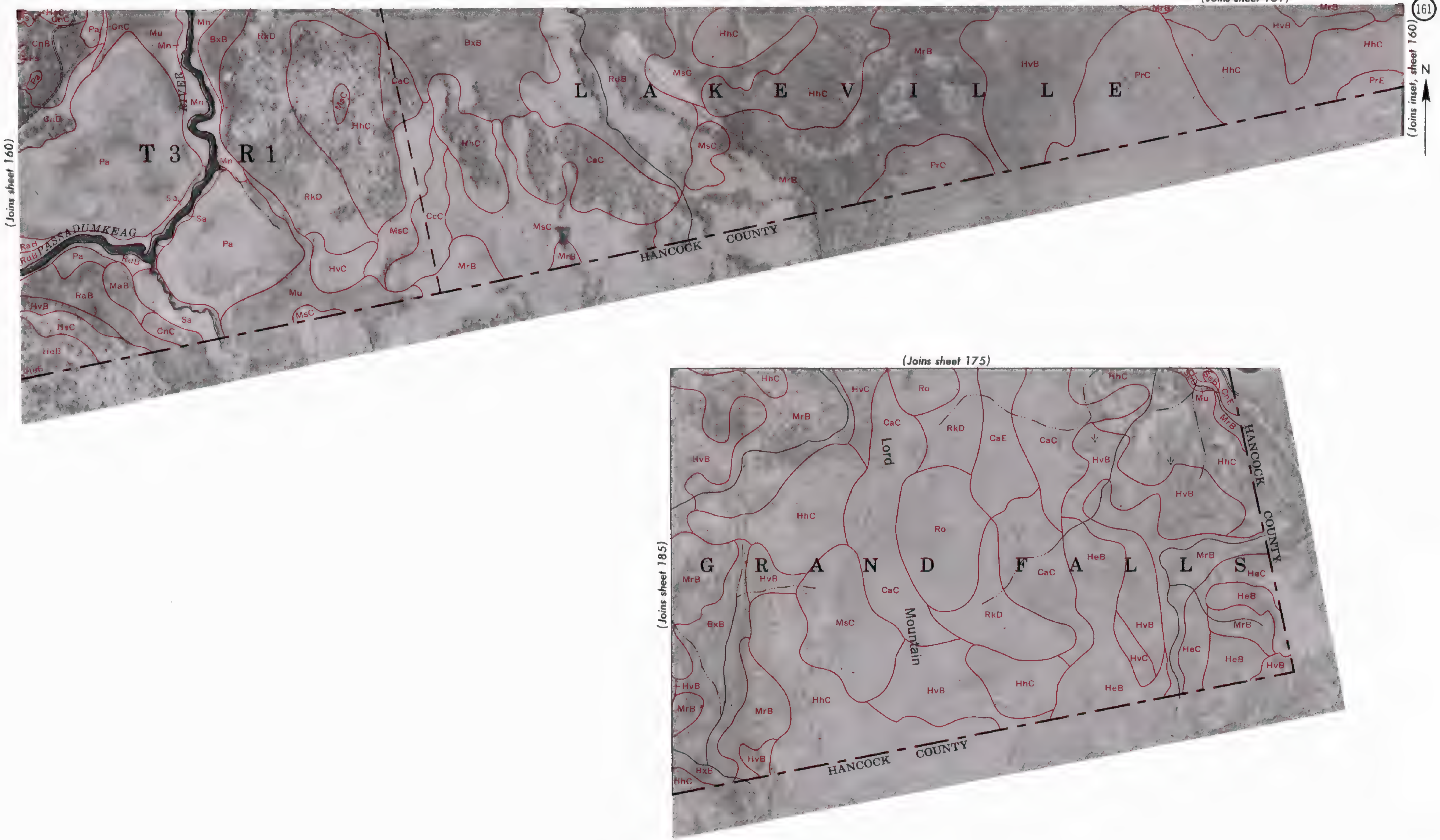
Scale 1:20 000

0 5000 Feet

160



0 ½ 1 Mile Scale 1:20 000 0 5000 Feet

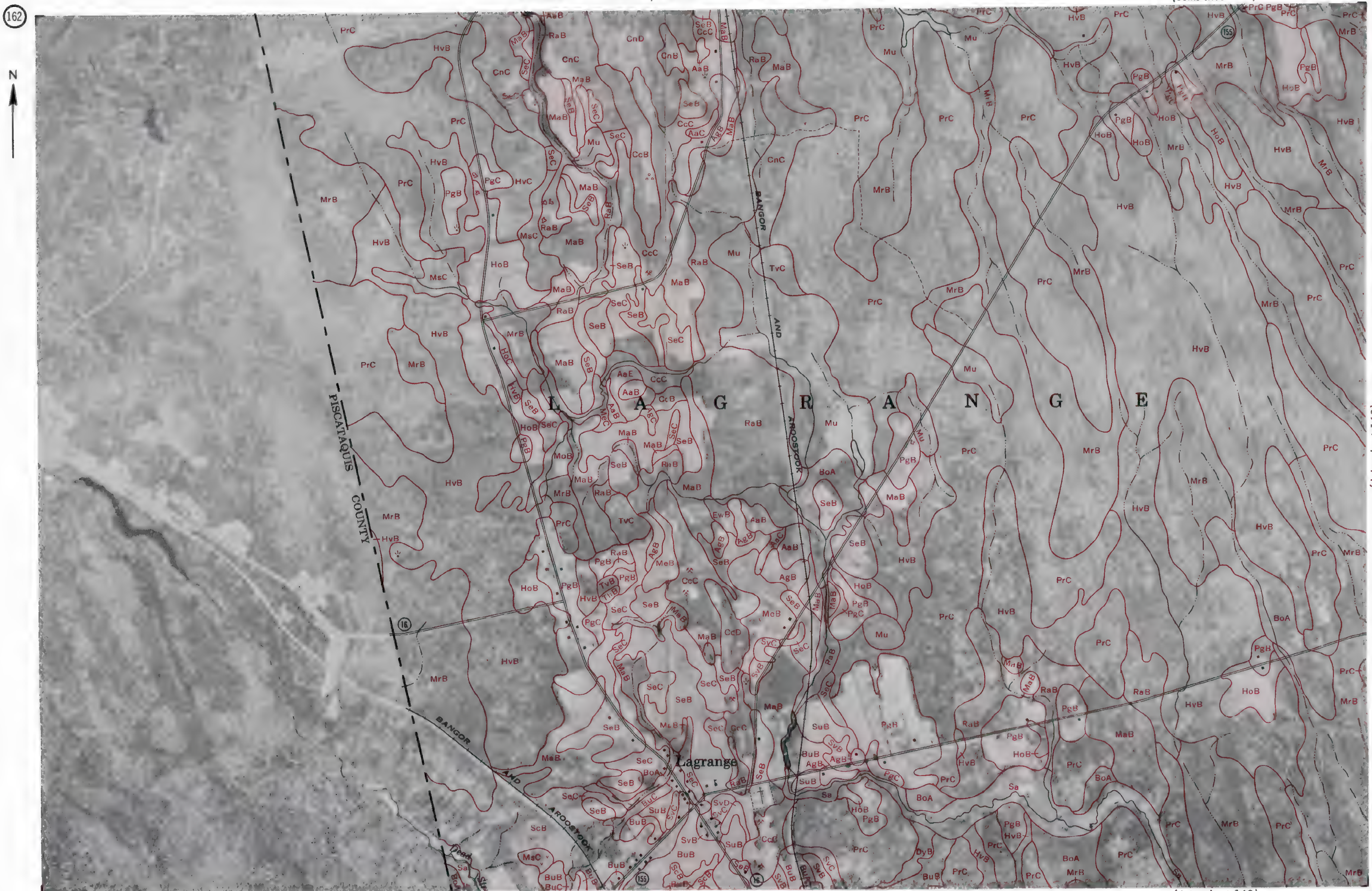


This map is one of a set compiled in 1962, as part of a soil survey by the Soil Conservation Service, United States Department of Agriculture, and the Maine Agricultural Experiment Station.

0 ½ 1 Mile Scale 1:20 000 0 5000 Feet

(162)

(Joins sheet 154)



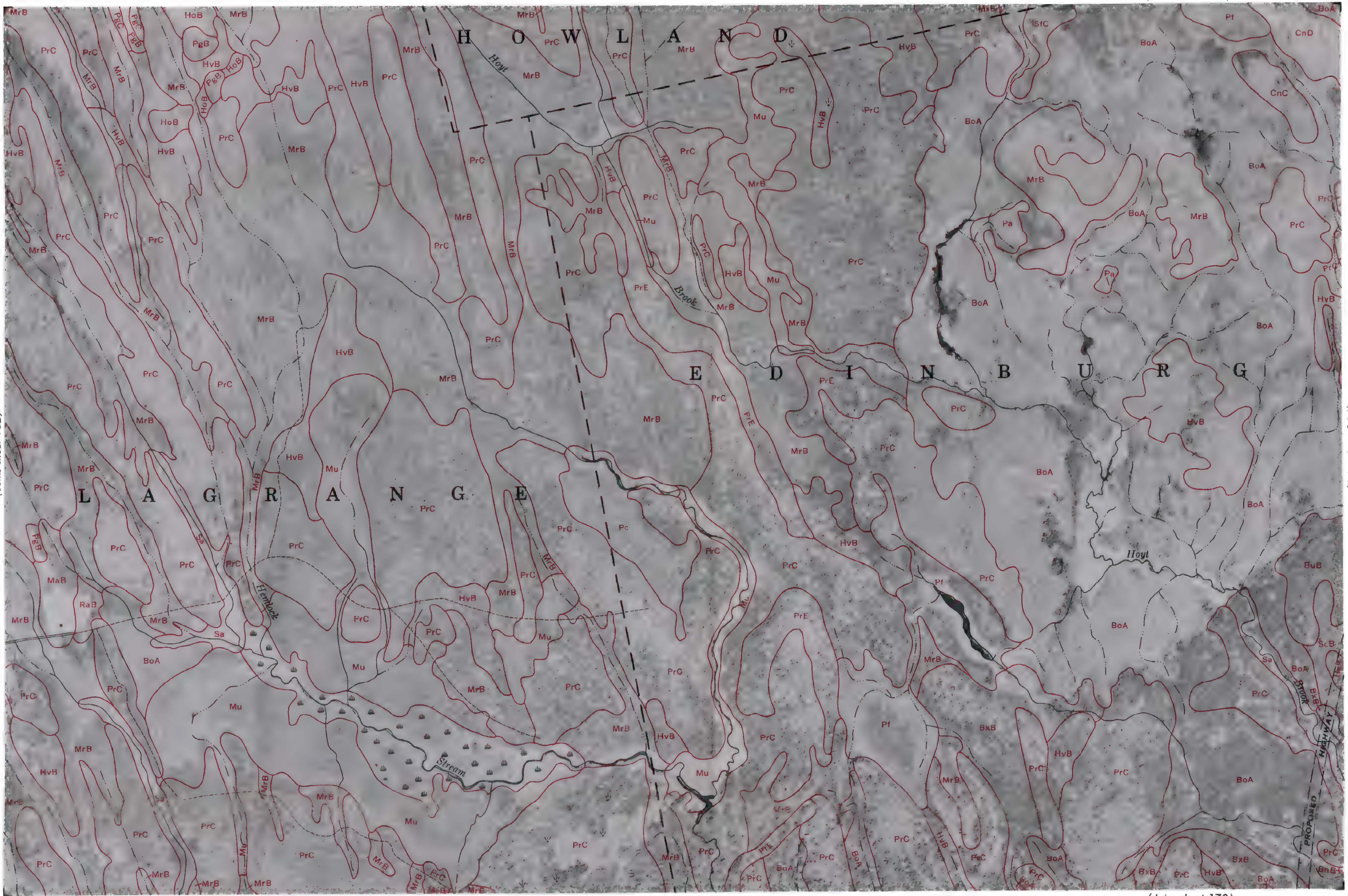
(Joins sheet 163)

(Joins sheet 169)

0 ½ 1 Mile Scale 1:20 000 0 5000 Feet

(Joins sheet 155)

(Joins sheet 162)



(Joins sheet 164)

(Joins sheet 170)

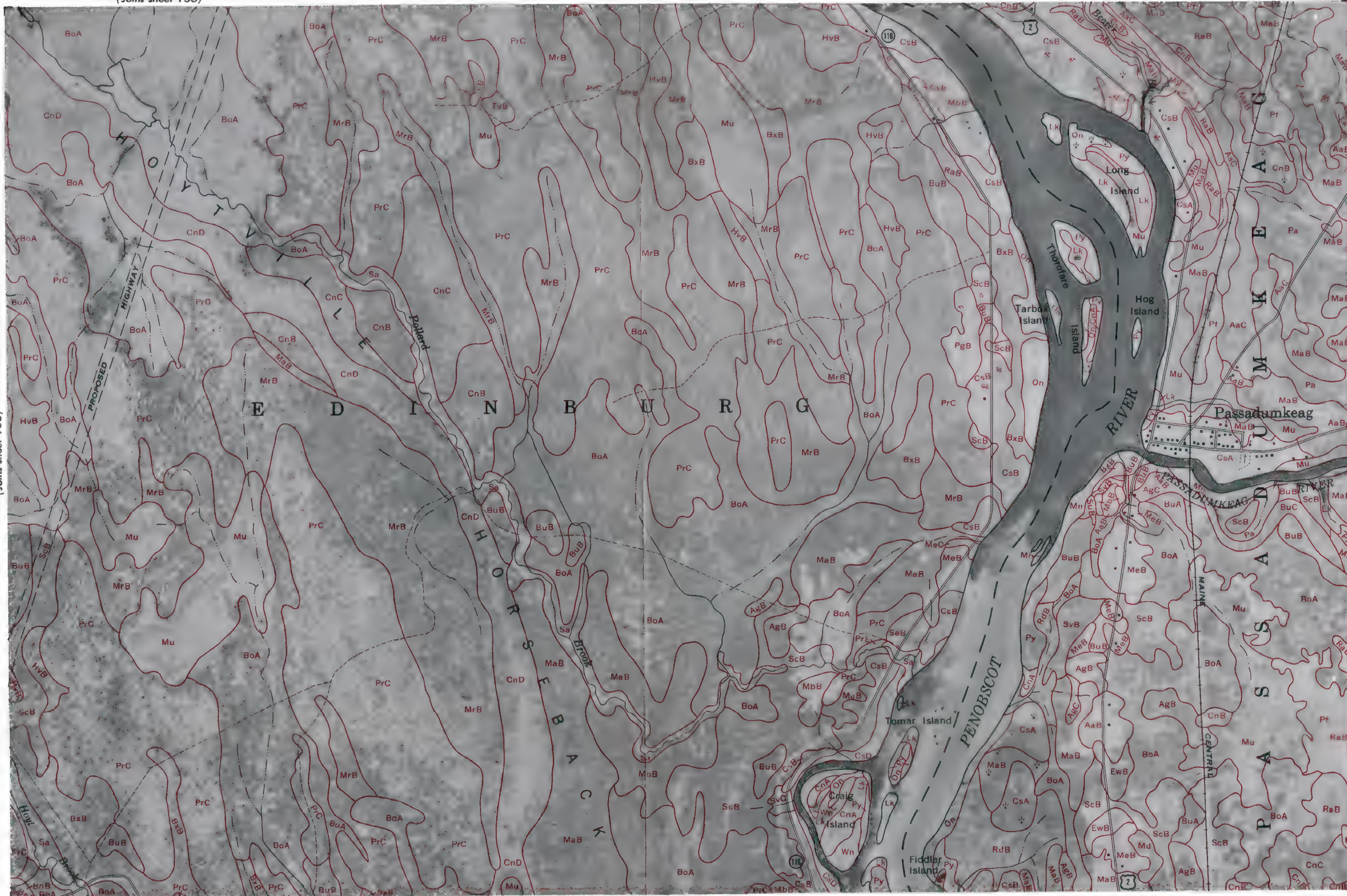
0 ½ 1 Mile Scale 1:20 000 0 5000 Feet

This map is one of a set compiled in 1962, as part of a soil survey by the Soil Conservation Service, United States Department of Agriculture, and the Maine Agricultural Experiment Station.

164

(Joins sheet 156)

(Joins sheet 163)



(Joins sheet 165)

(Joins sheet 171)

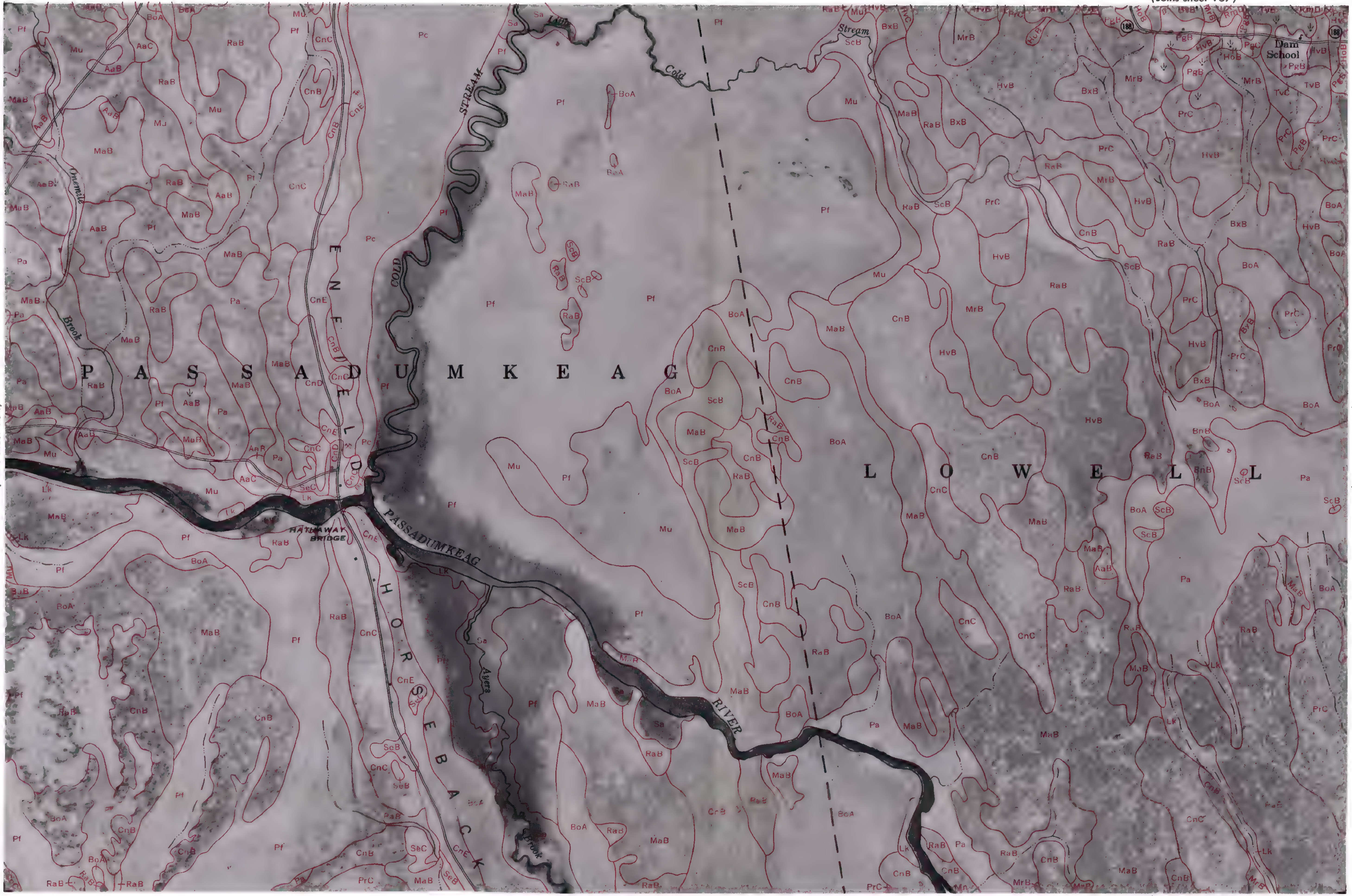
0 ½ 1 Mile Scale 1:20 000 0 5000 Feet

This map is one of a set compiled in 1962, as part of a soil survey by the Soil Conservation Service, United States Department of Agriculture, and the Maine Agricultural Experiment Station.

(Joins sheet 157)

165

(Joins sheet 164)



(Joins sheet 166)

(Joins sheet 172)

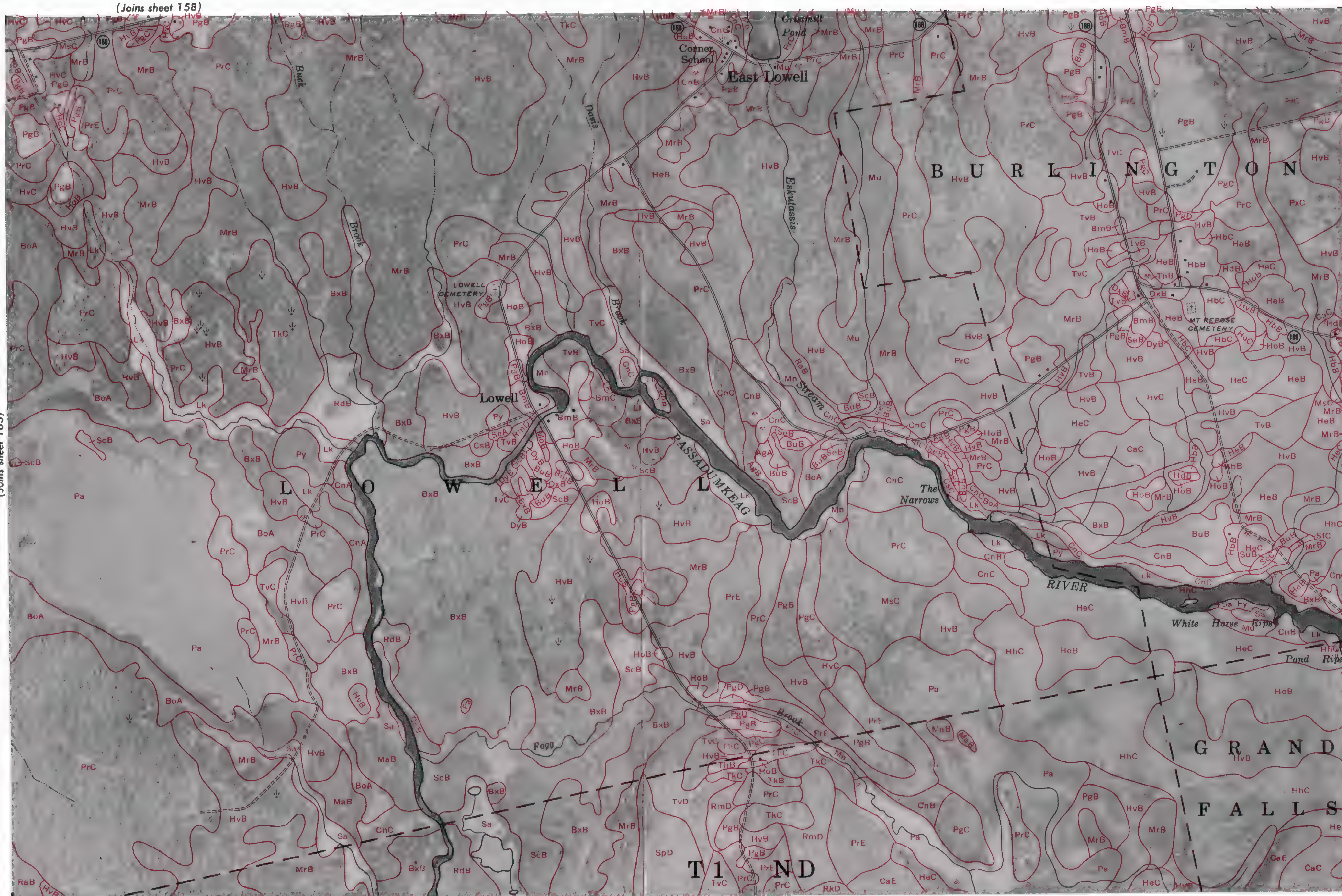
0 ½ 1 Mile

Scale 1:20 000

0 5000 Feet

166

(Joins sheet 158)



(Joins sheet 165)

(Joins sheet 167)

(Joins sheet 173)

0 ½ 1 Mile Scale 1:20 000 0 5000 Feet

(Joins sheet 159)

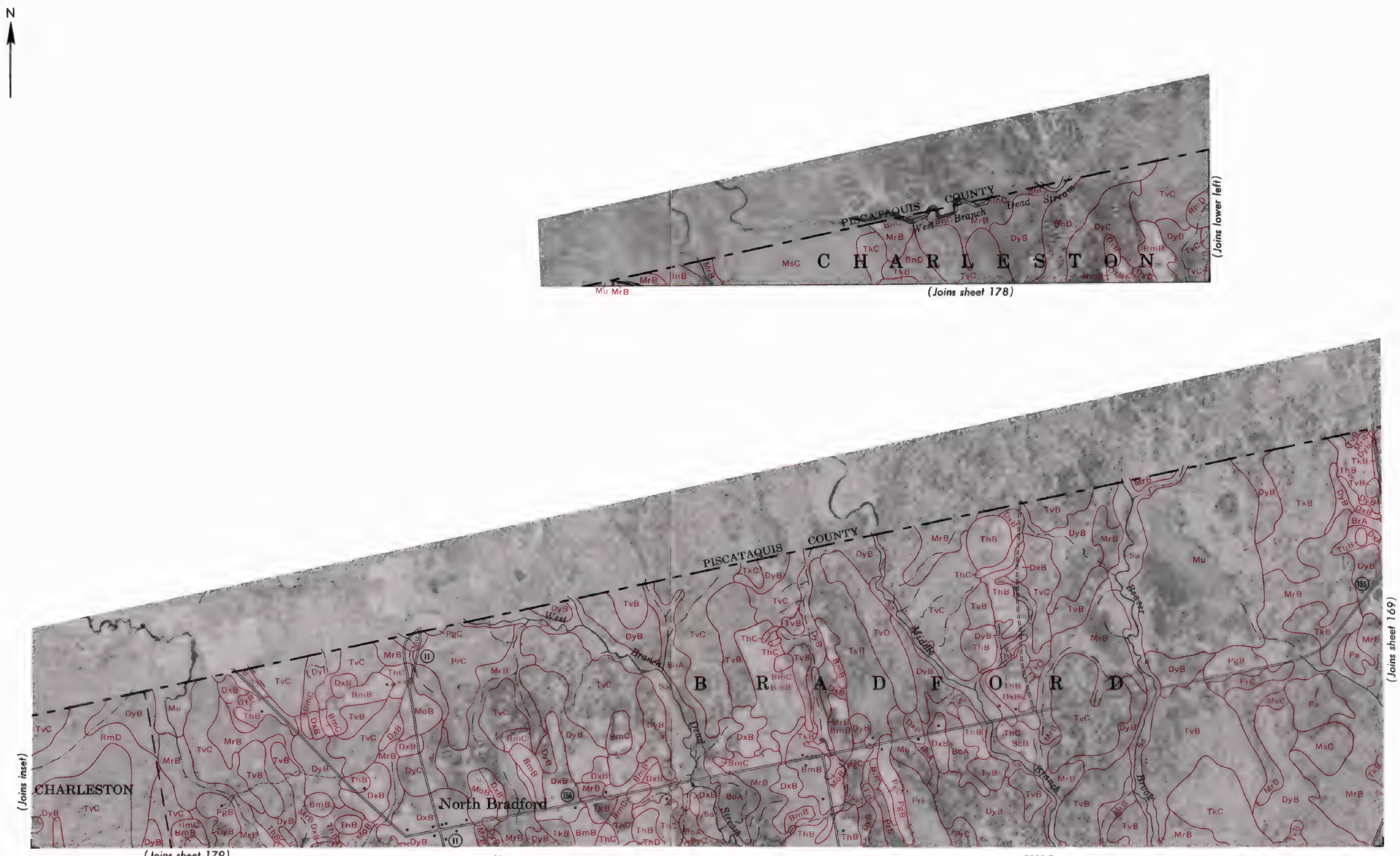
(Joins sheet 166)

(Joins inset, sheet 175)

(Joins sheet 174)

0 ½ 1 Mile Scale 1:20 000 0 5000 Feet

This map is one of a set compiled in 1962, as part of a soil survey by the Soil Conservation Service, United States Department of Agriculture, and the Maine Agricultural Experiment Station.

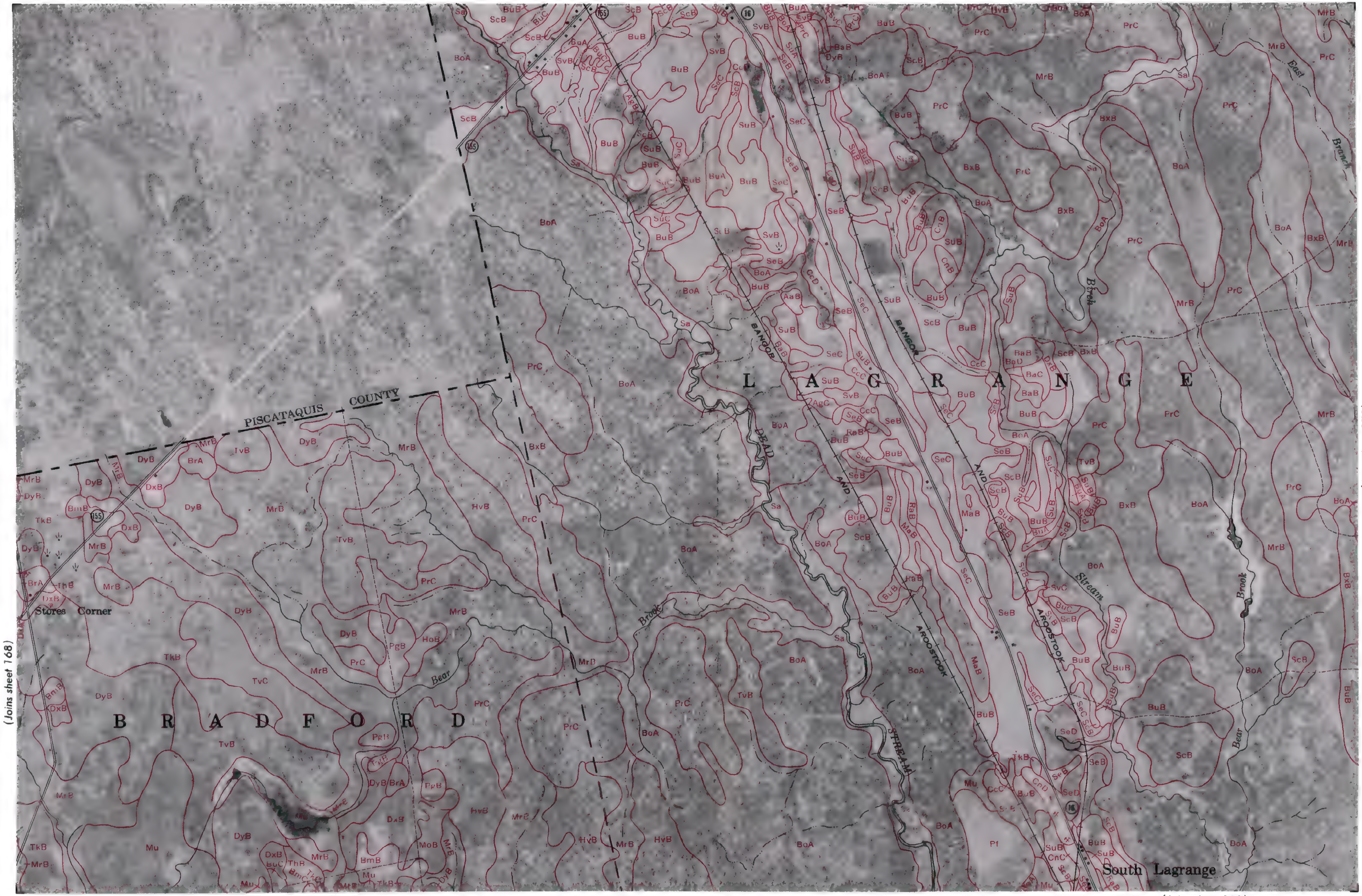


0 ½ 1 Mile Scale 1:20 000 0 5000 Feet

(Joins sheet 162)

169

N



(Joins sheet 168)

(Joins sheet 170)

(Joins sheet 180)

0 ½ 1 Mile Scale 1:20 000 0 5000 Feet

This map is one of a set compiled in 1962, as part of a soil survey by the Soil Conservation Service, United States Department of Agriculture, and the Maine Agricultural Experiment Station.

(Joins sheet 13)

17

(Joins sheet 18)

(Joins sheet 21)

0 ½ 1 Mile Scale 1:20 000 0 5000 Feet

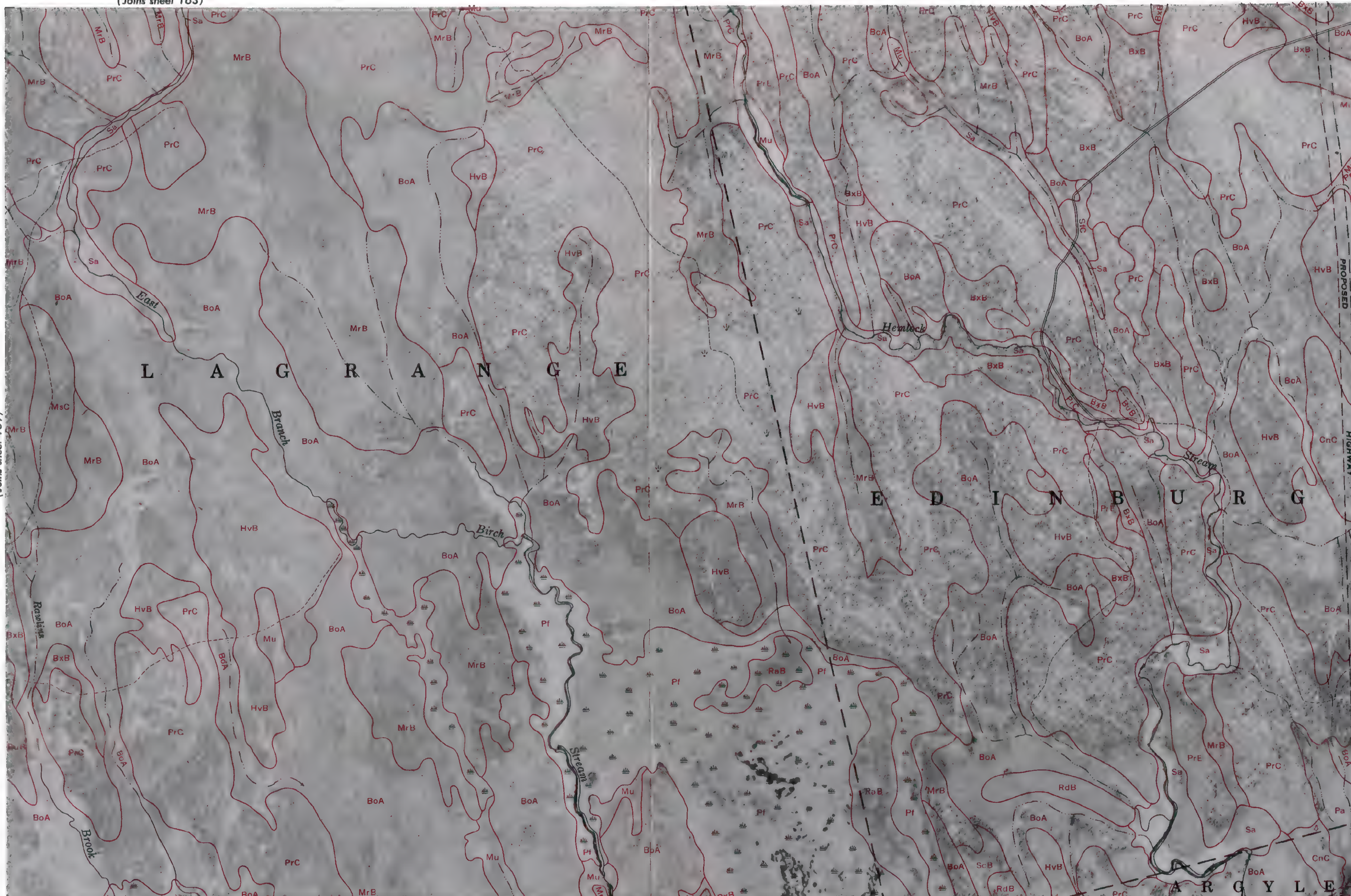
This map is one of a set compiled in 1962, as part of a soil survey by the Soil Conservation Service, United States Department of Agriculture, and the Maine Agricultural Experiment Station.

170

(Joins sheet 163)

N

(Joins sheet 169)

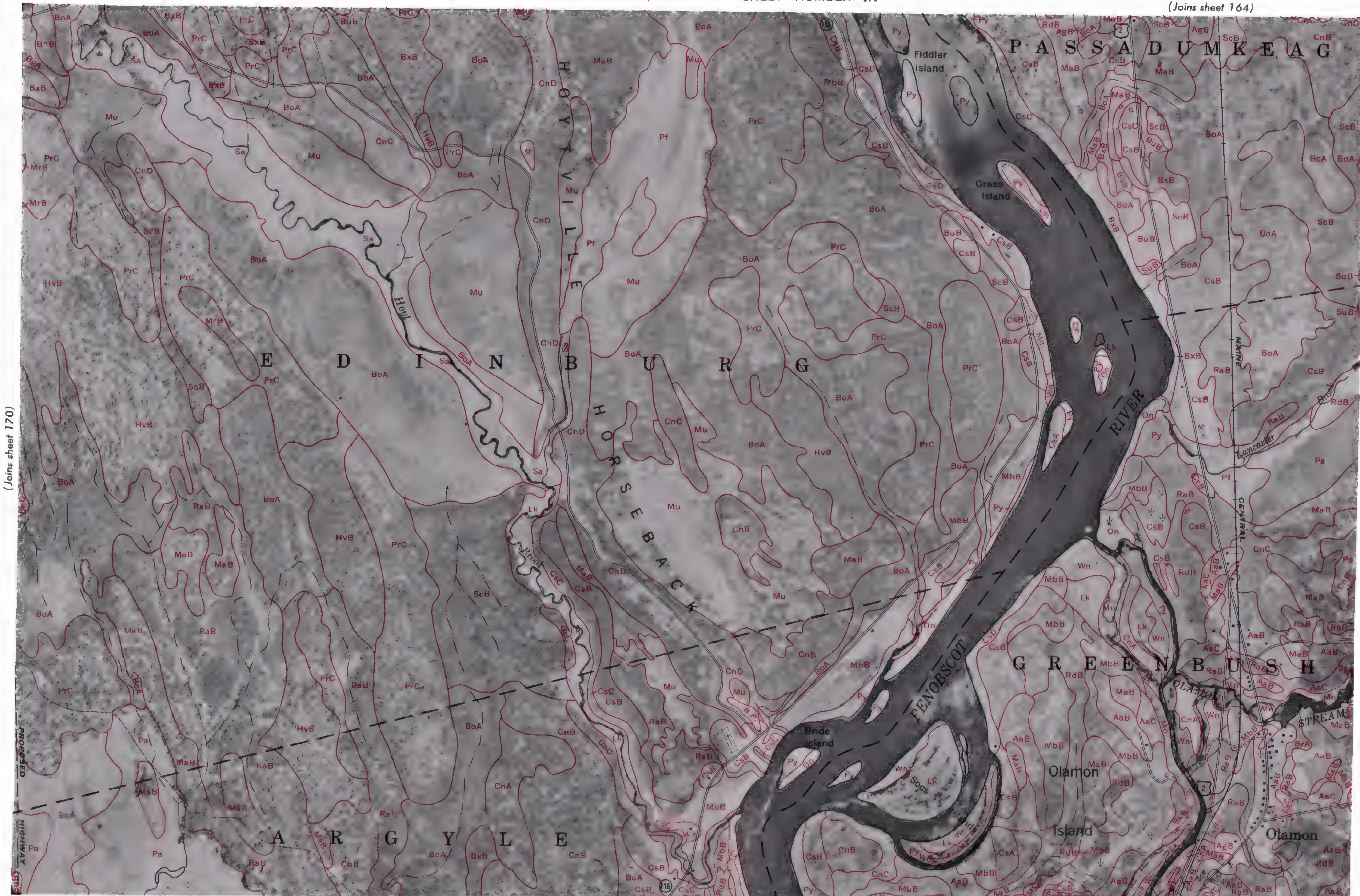


(Joins sheet 171)

(Joins sheet 181)

0 ½ 1 Mile Scale 1:20 000 0 5000 Feet

(Joins sheet 164)



(Joins sheet 170)

(Joins sheet 172)

(Joins sheet 182)

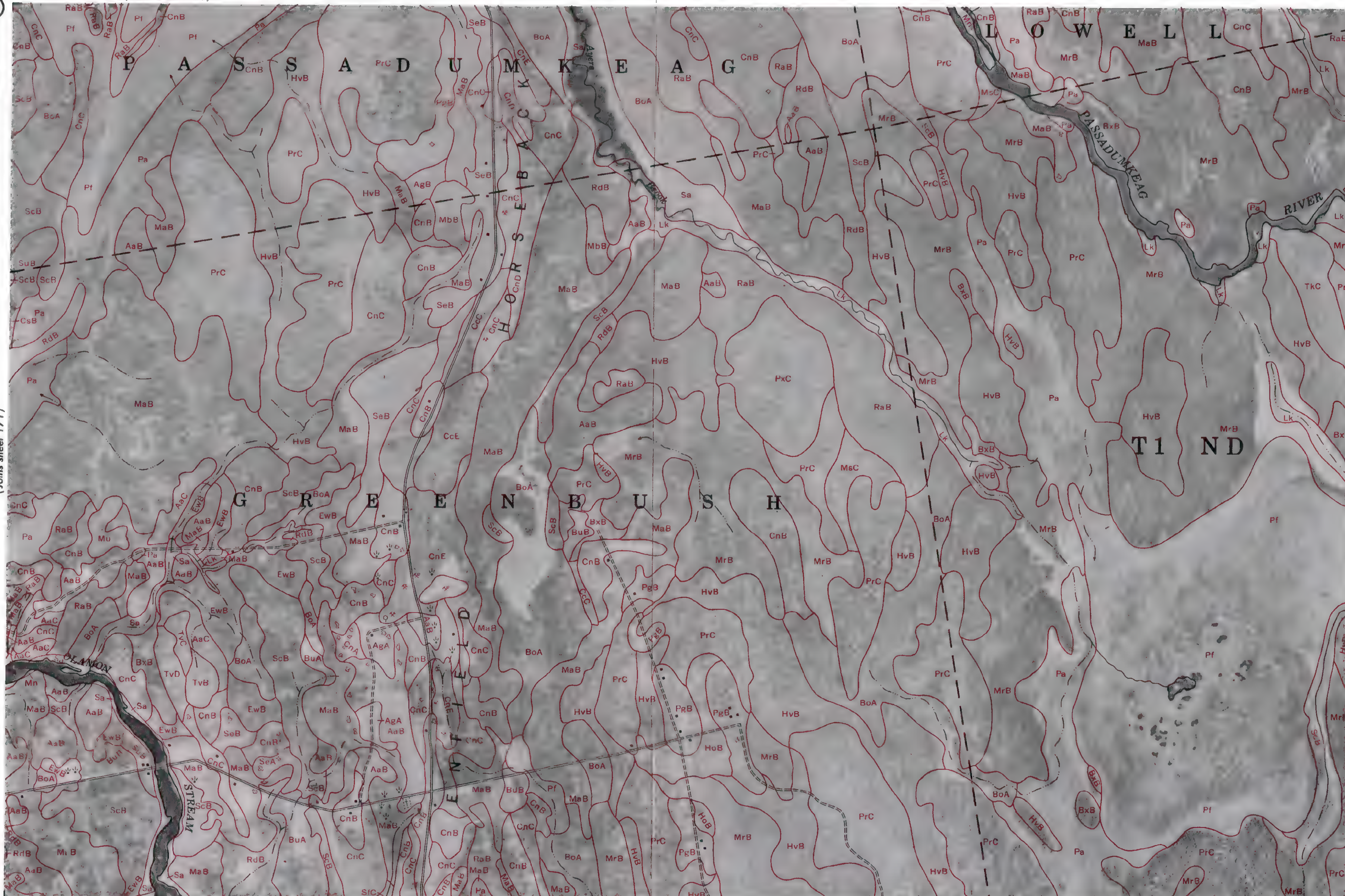
Scale 1:20 000

0 ½ 1 Mile

0 5000 Feet

This map is one of a set compiled in 1962, as part of a soil survey by the Soil Conservation Service, United States Department of Agriculture, and the Maine Agricultural Experiment Station.

(Joins sheet 165)



(Joins sheet 183)

Scale 1:20 000

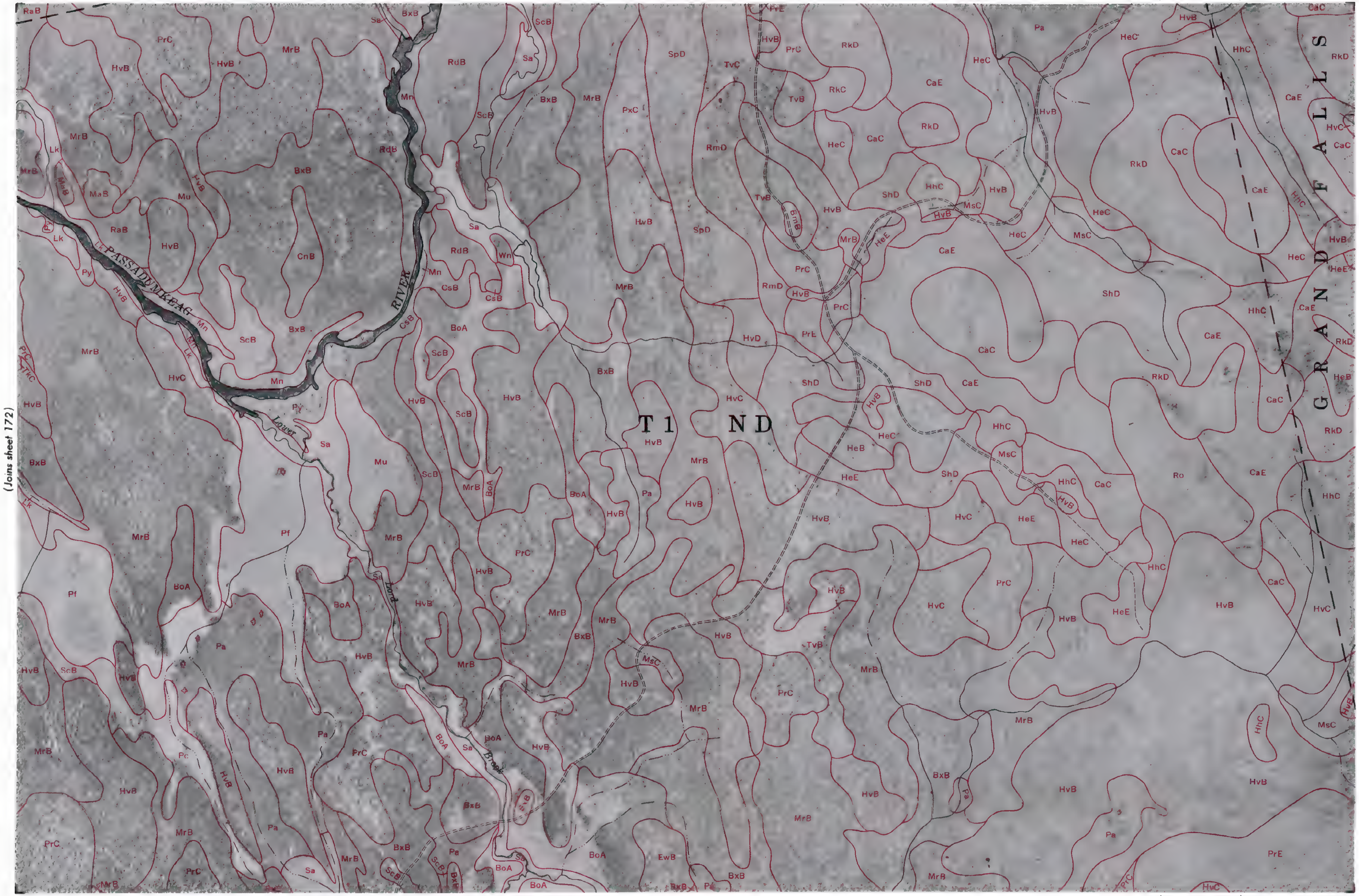
0 ½ 1 Mile

0 5000 Feet

173

(Joins sheet 166)

(Joins sheet 172)



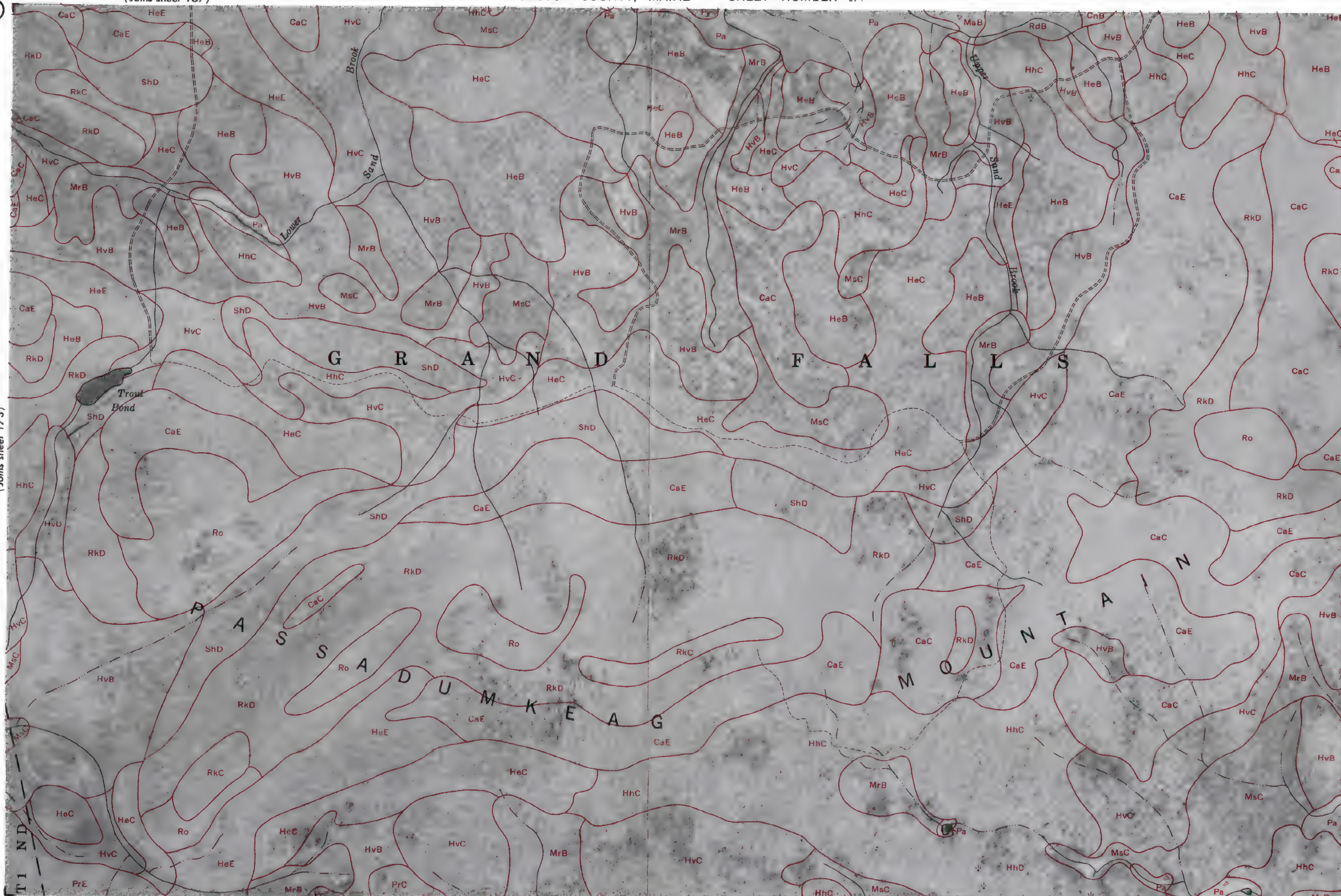
(Joins sheet 174)

(Joins sheet 184)

0 ½ 1 Mile Scale 1:20 000 0 5000 Feet

This map is one of a set compiled in 1962, as part of a soil survey by the Soil Conservation Service, United States Department of Agriculture, and the Maine Agricultural Experiment Station.

(Joins sheet 167)



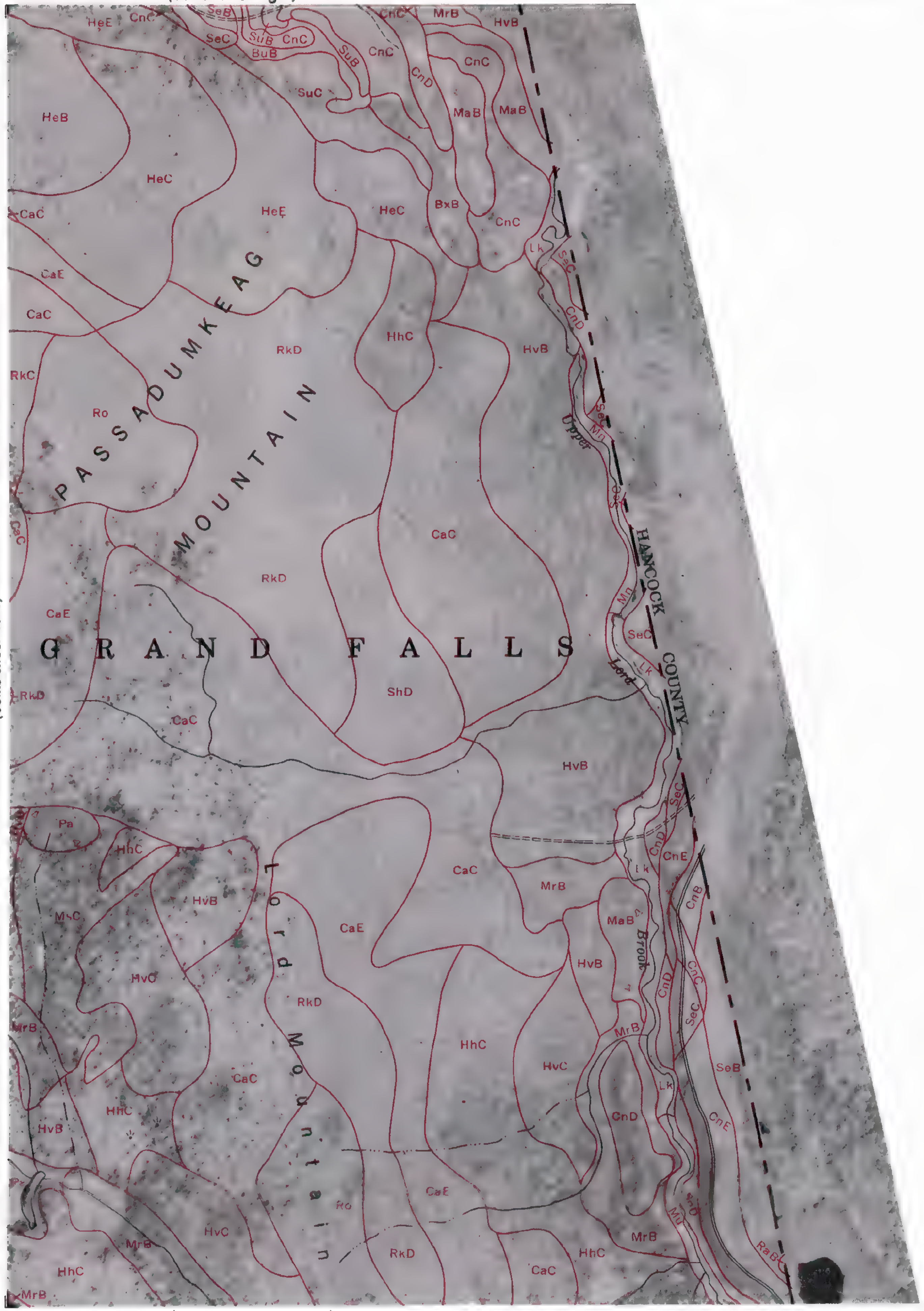
(Joins sheet 173)

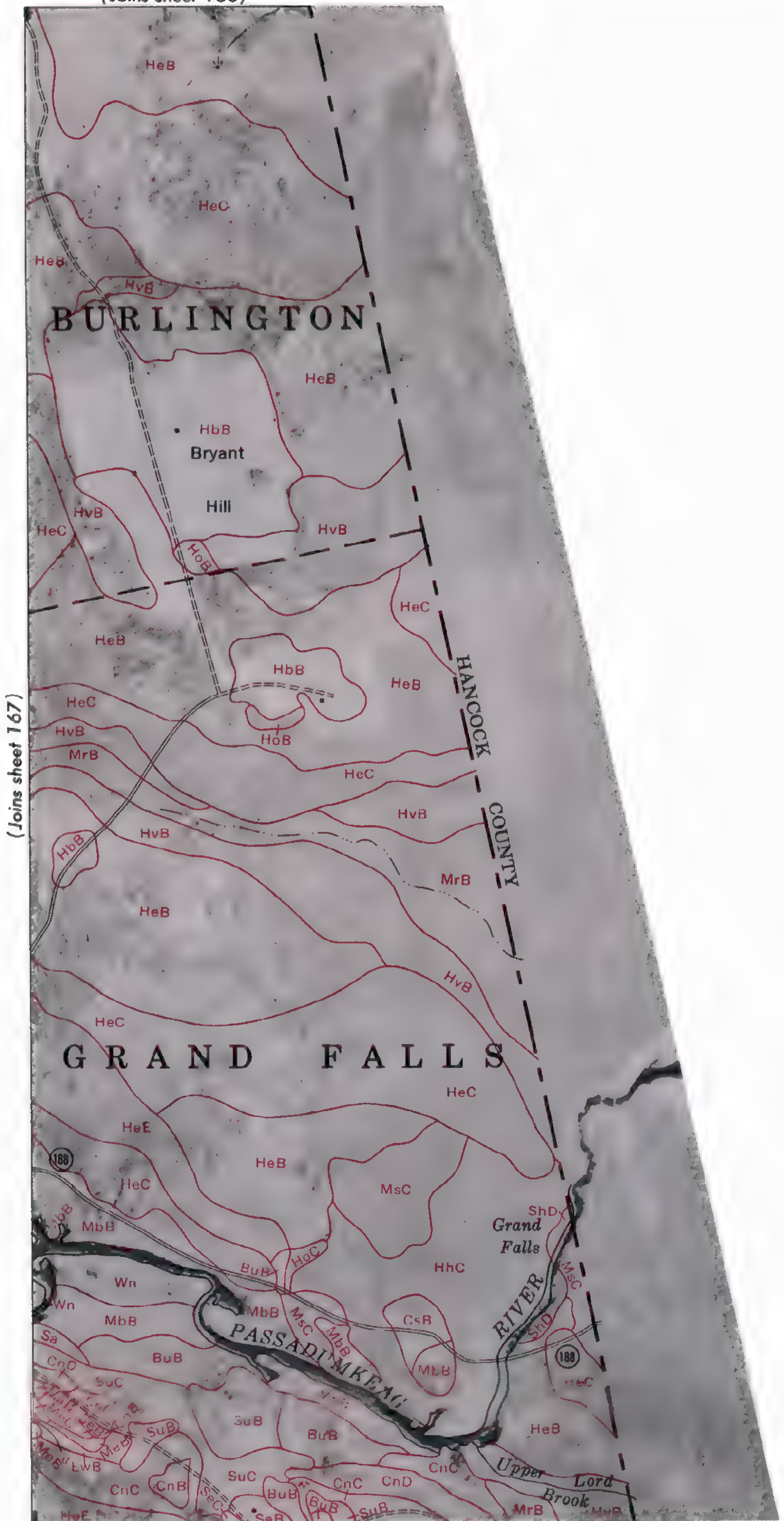
(Joins sheet 175)

(Joins sheet 185)

Scale 1:20 000
0 ½ 1 Mile
0 5000 Feet

This map is one of a set compiled in 1962, as part of a soil survey by the Soil Conservation Service, United States Department of Agriculture, and the Maine Agricultural Experiment Station.



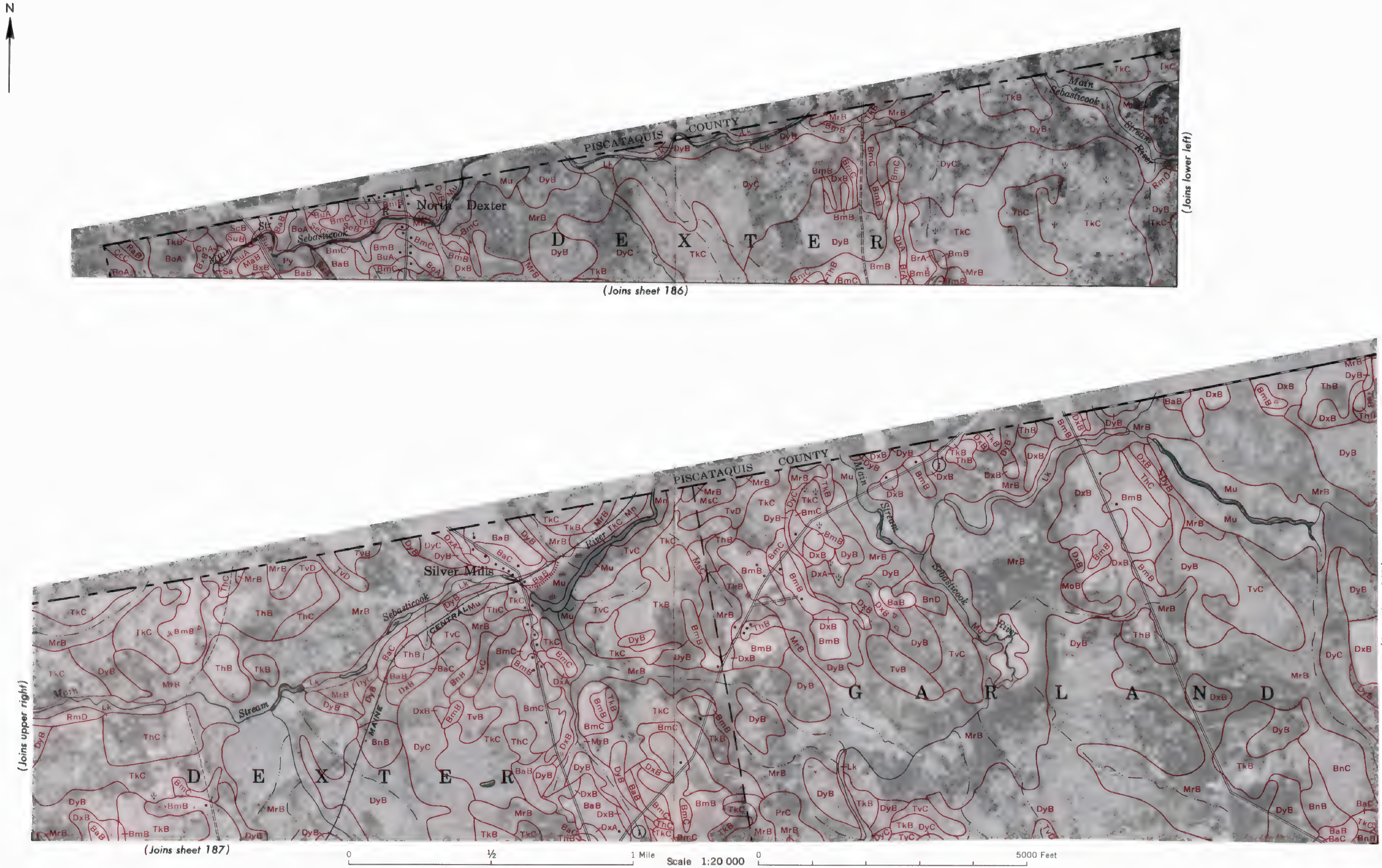


0 ½ 1 Mile

Scale 1:20 000

0 5000 Feet

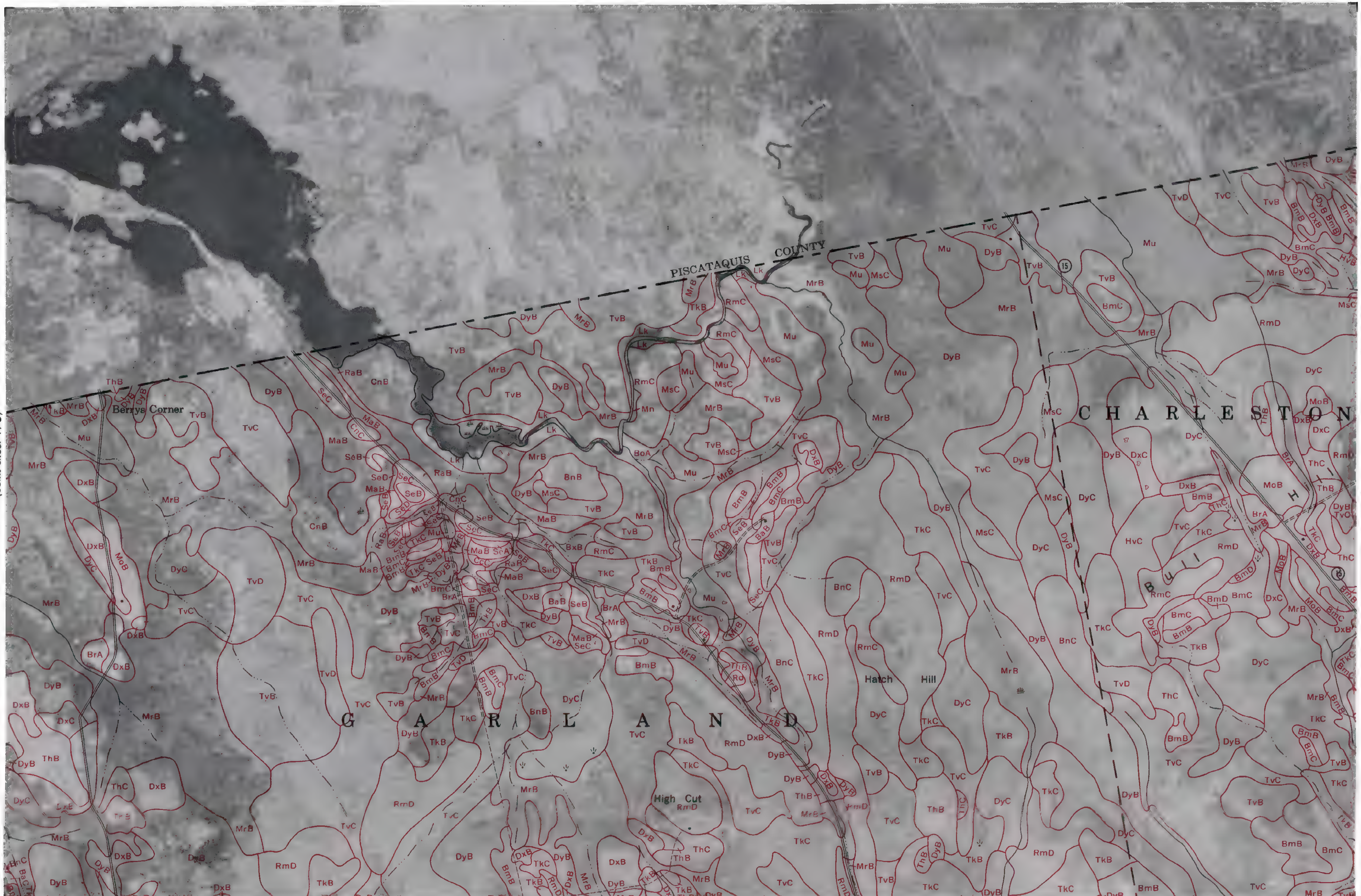
(176)


N
PISCATAQUIS COUNTY
North Dexter
D E X T E R
Main Sebasticook Stream
Main Sebasticook River
(Joins lower left)
(Joins sheet 186)
PISCATAQUIS COUNTY
Silver Mills
Sebasticook River
MAINE CENTRAL
Main Stream
G A R L A N D
D E X T E R
(Joins upper right)
(Joins sheet 177)
(Joins sheet 187)
0 ½ 1 Mile
Scale 1:20 000
0 5000 Feet

177

This map is one of a set compiled in 1962, as part of a soil survey by the Soil Conservation Service, United States Department of Agriculture, and the Maine Agricultural Experiment Station.

(Joins sheet 176)



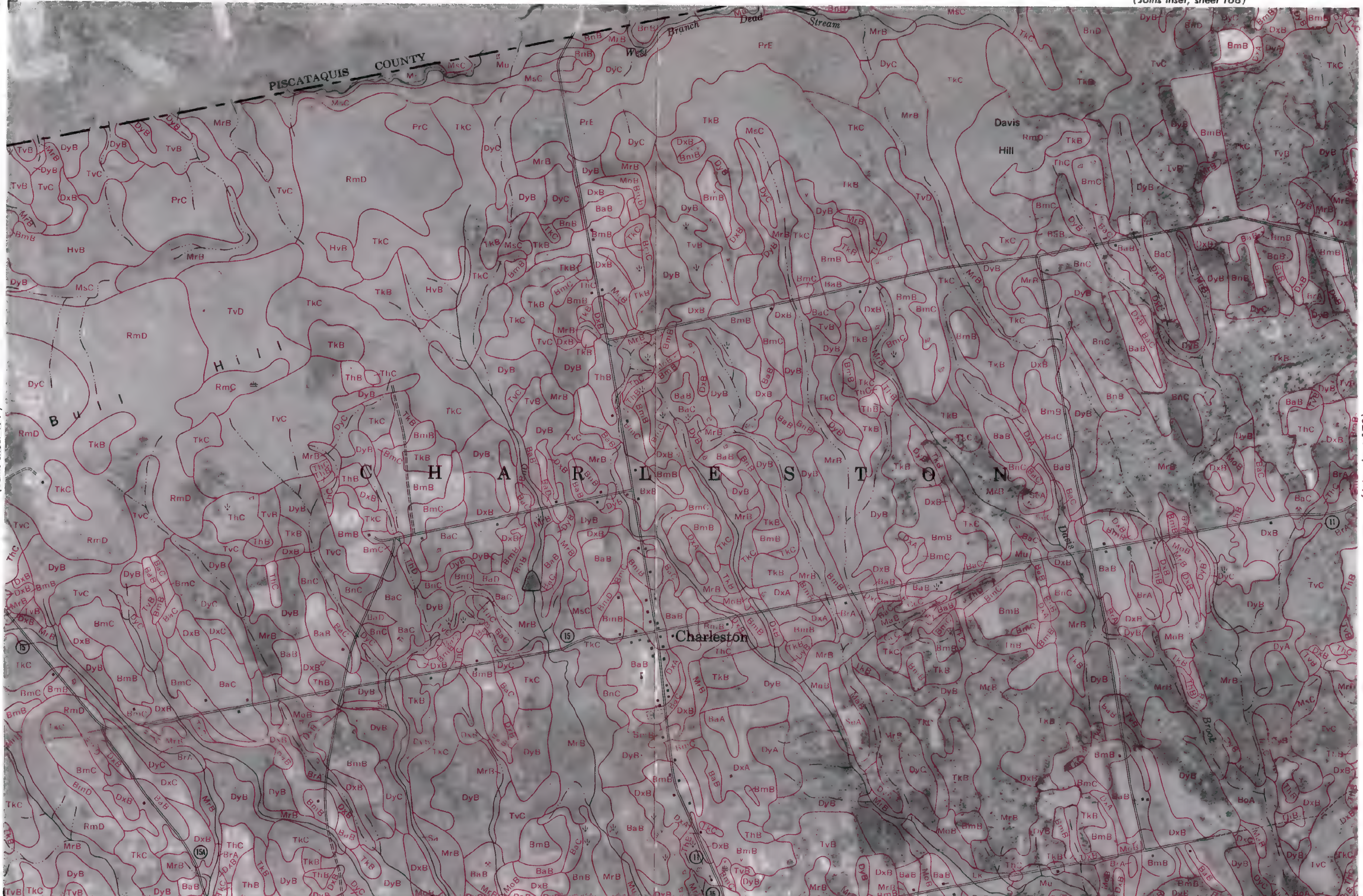
(Joins sheet 178)

(Joins sheet 188)

0 ½ 1 Mile Scale 1:20 000 0 5000 Feet

(Joins inset, sheet 168)

(Joins sheet 177)



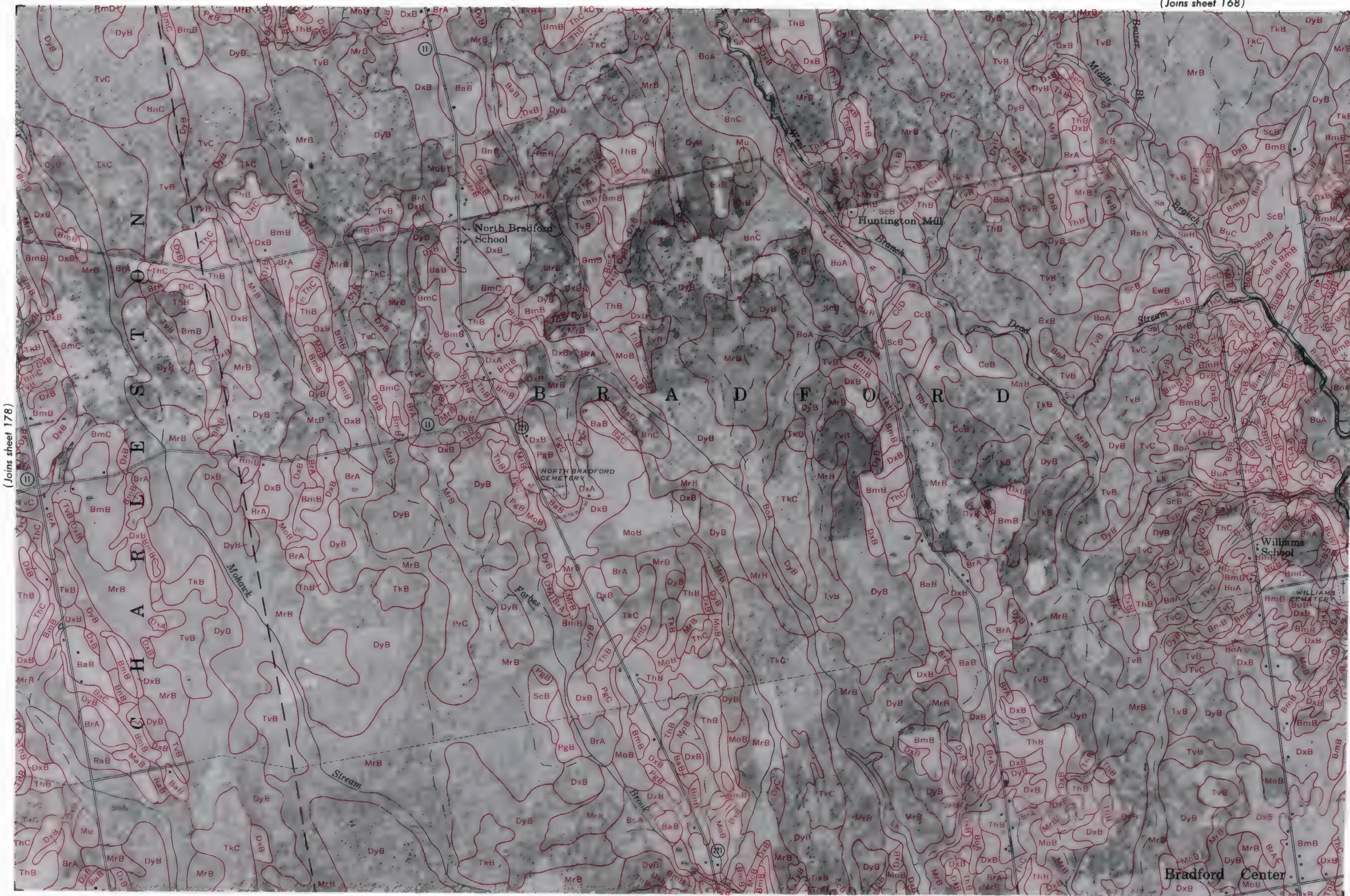
(Joins sheet 179)

(Joins sheet 189)

0 ½ 1 Mile Scale 1:20 000 0 5000 Feet

(Joins sheet 168)

179



(Joins sheet 178)

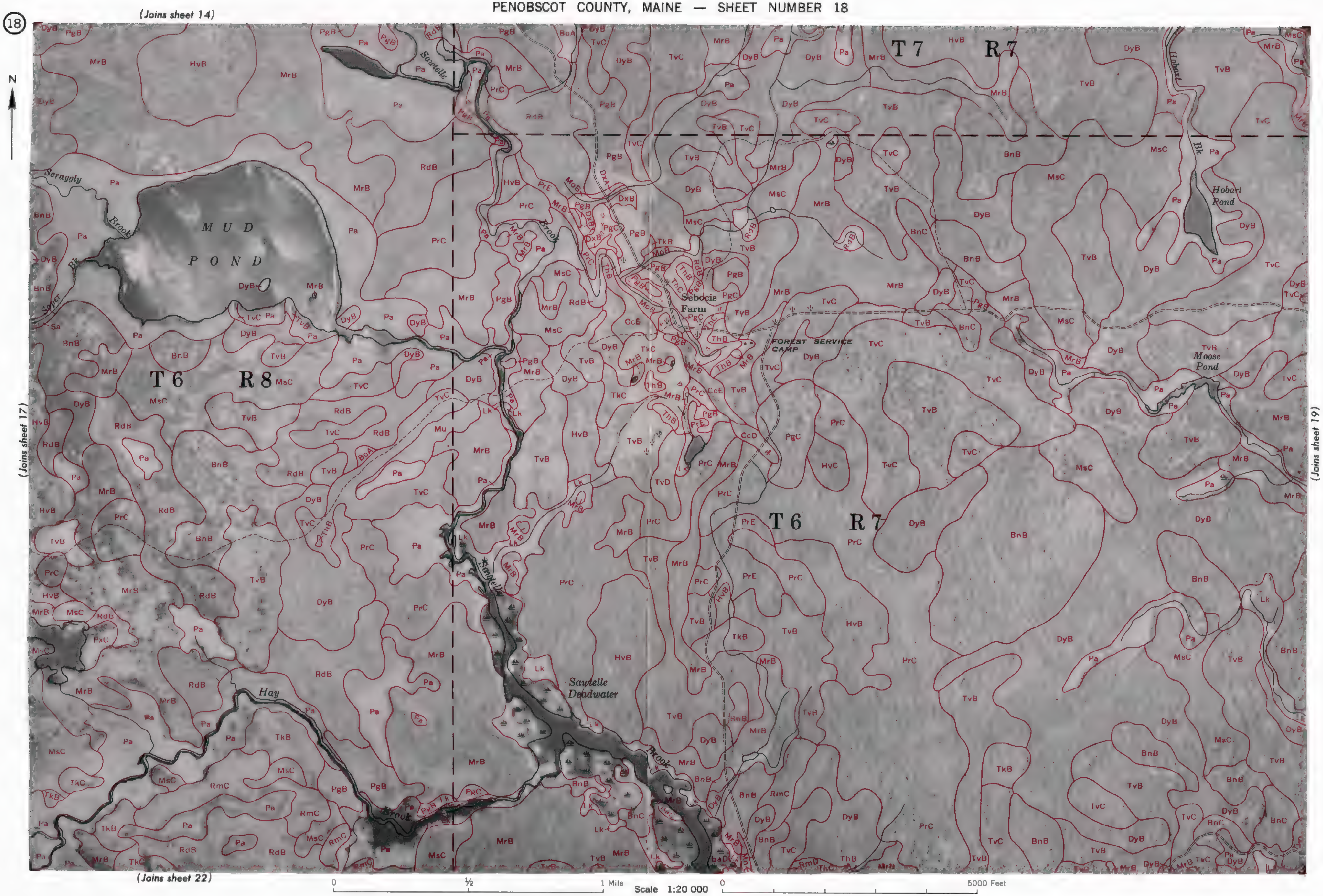
(Joins sheet 180)

(Joins sheet 190)

0 ½ 1 Mile Scale 1:20 000 0 5000 Feet

This map is one of a set compiled in 1962, as part of a soil survey by the Soil Conservation Service, United States Department of Agriculture, and the Maine Agricultural Experiment Station.

PENOBSCOT COUNTY, MAINE — SHEET NUMBER 18

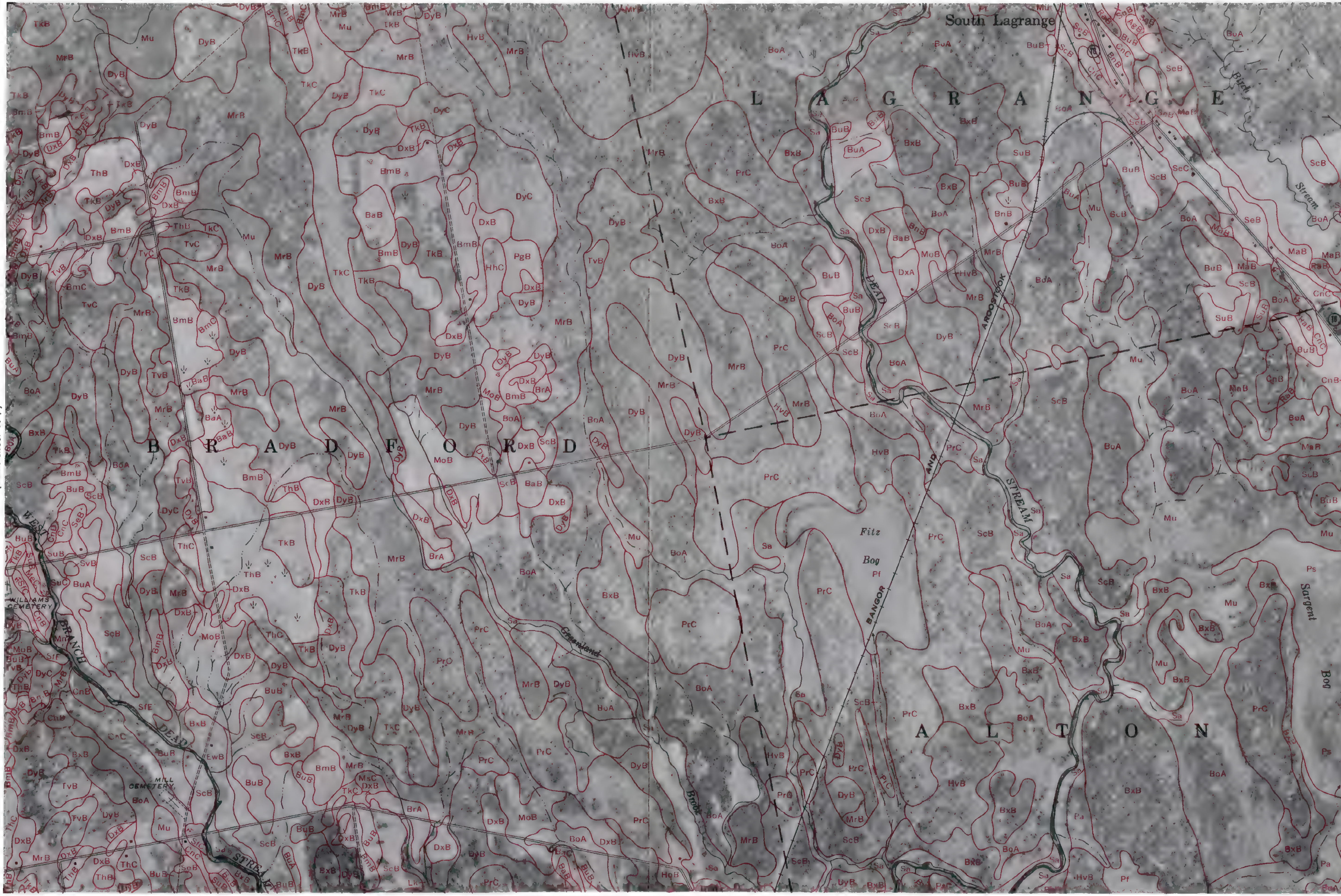


180

(Joins sheet 169)

N

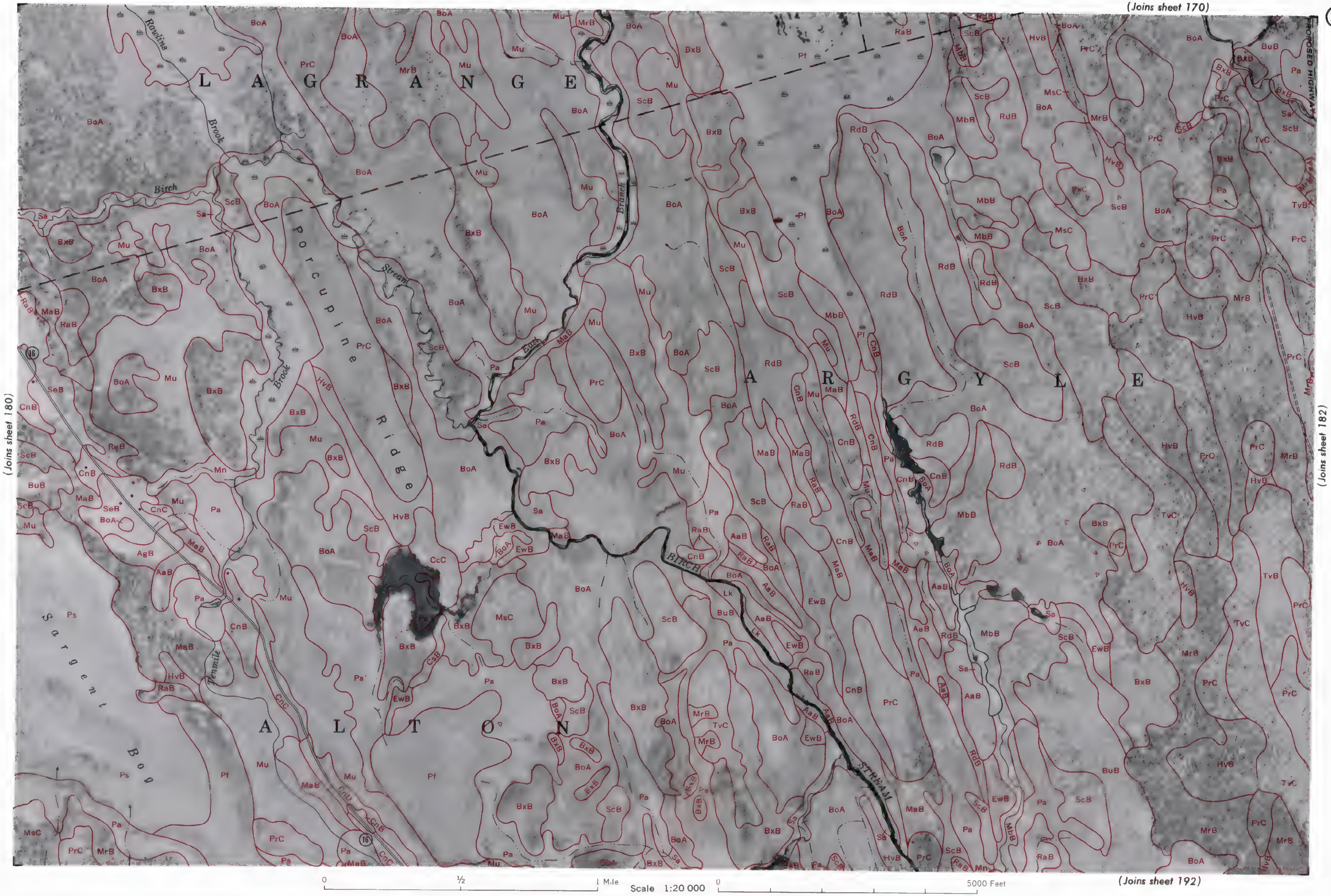
(Joins sheet 179)



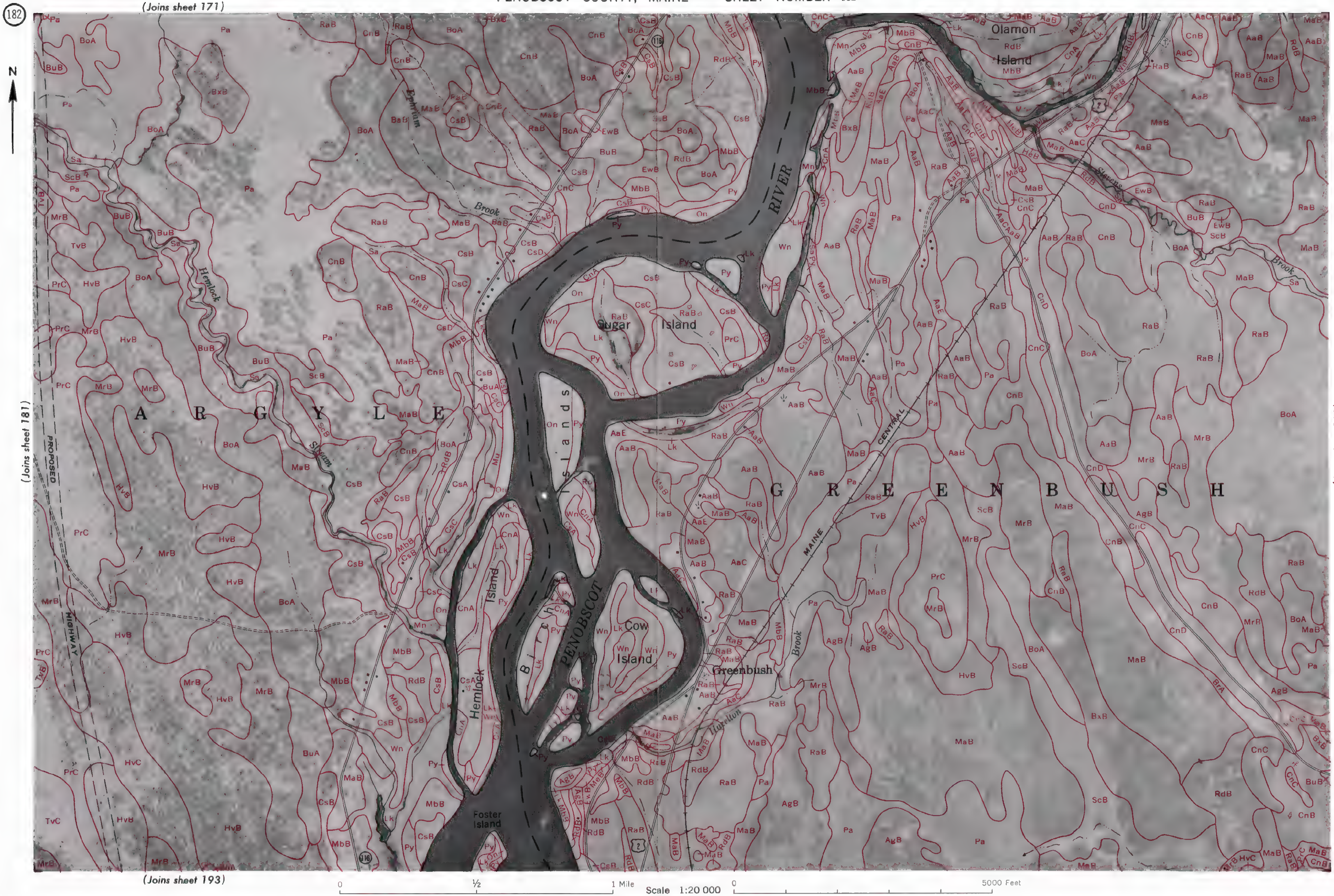
(Joins sheet 181)

(Joins sheet 191)

0 ½ 1 Mile Scale 1:20 000 0 5000 Feet



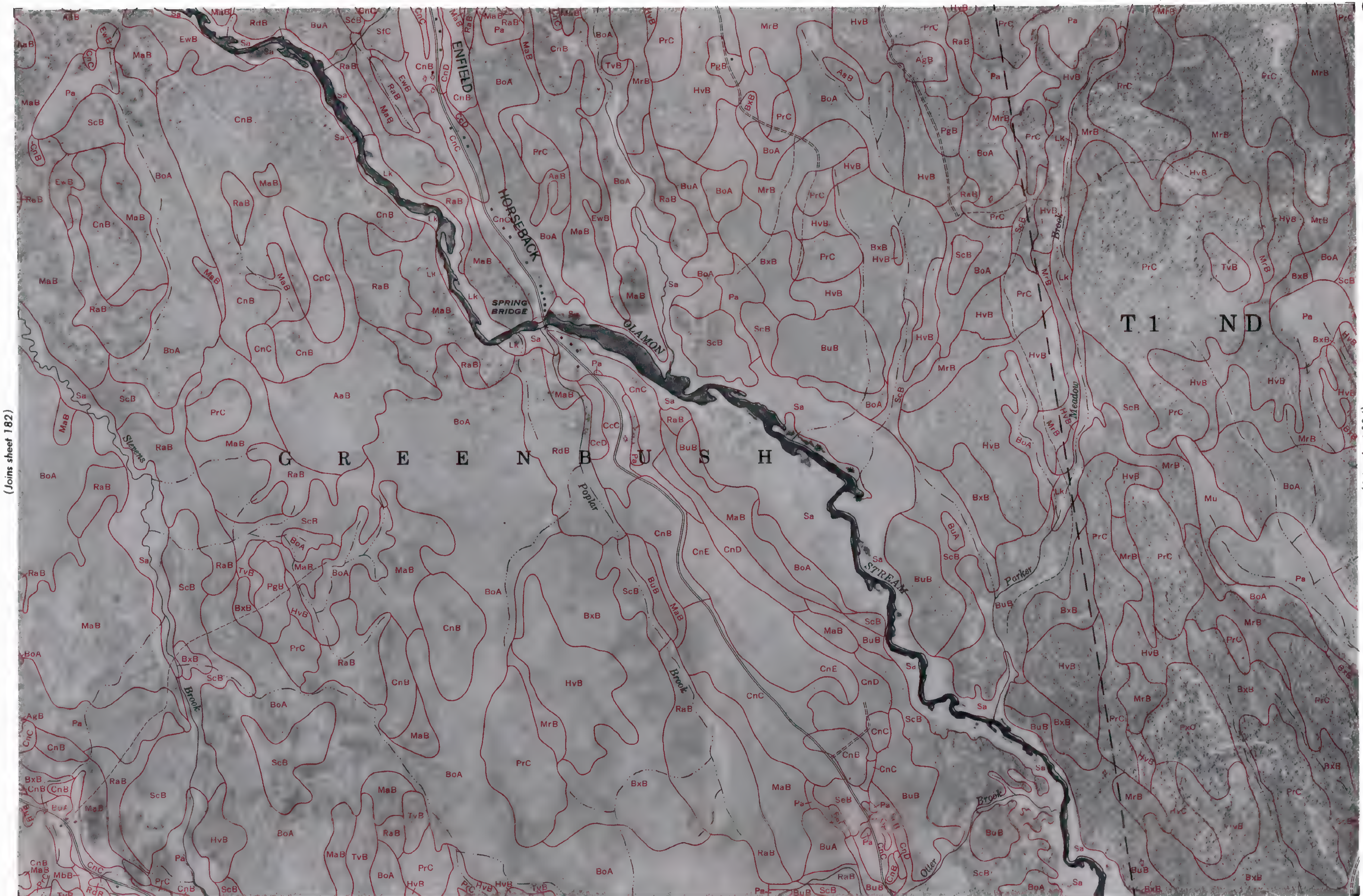
This map is one of a set compiled in 1962, as part of a soil survey by the Soil Conservation Service, United States Department of Agriculture, and the Maine Agricultural Experiment Station.



Scale 1:20 000

(Joins sheet 172)

183



(Joins sheet 182)

(Joins sheet 184)

(Joins sheet 194)

0 ½ 1 Mile Scale 1:20 000 0 5000 Feet

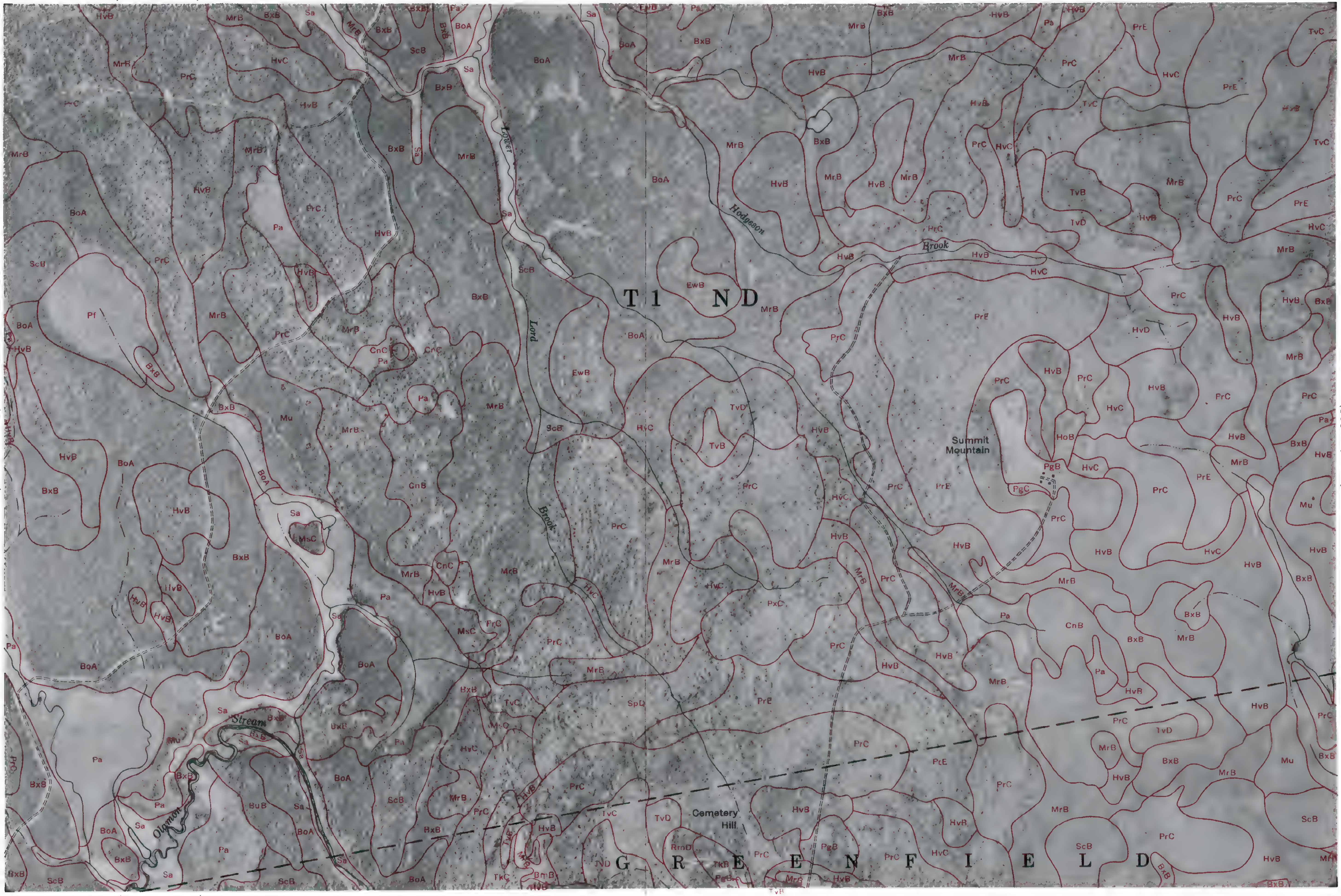
This map is one of a set compiled in 1962, as part of a soil survey by the Soil Conservation Service, United States Department of Agriculture, and the Maine Agricultural Experiment Station.

PENOBSCOT COUNTY, MAINE — SHEET NUMBER 184

(Joins sheet 173)

N

(Joins sheet 183)



(Joins sheet 185)

(Joins sheet 195)

0 ½ 1 Mile Scale 1:20 000 0 5000 Feet

(Joins sheet 174)

185

This map is one of a set compiled in 1962, as part of a soil survey by the Soil Conservation Service, United States Department of Agriculture, and the Maine Agricultural Experiment Station.

(Joins inset, sheet 176)

N

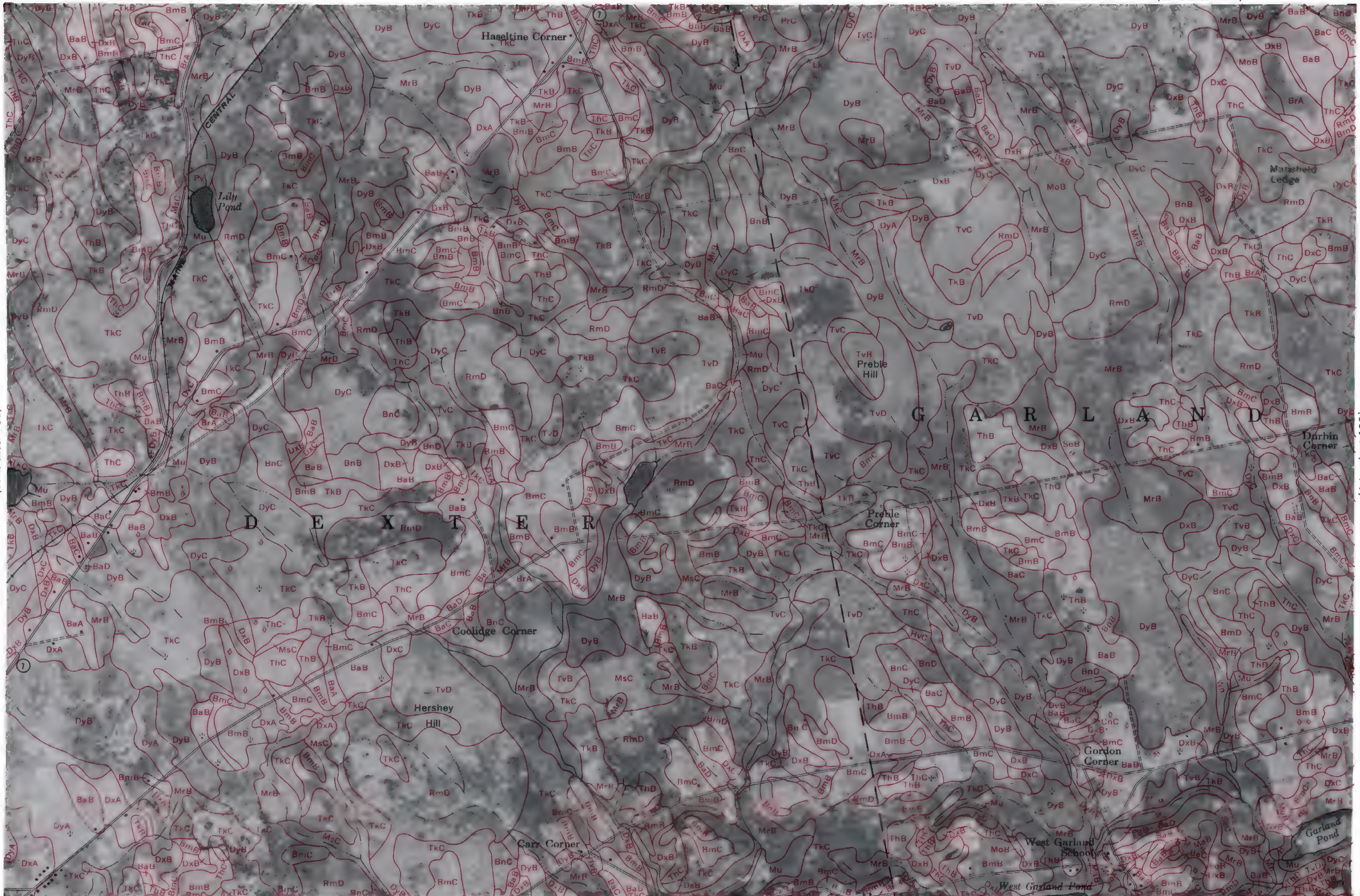
(Joins sheet 187)

0 ½ 1 Mile Scale 1:20 000 0 5000 Feet

(Joins sheet 197)

(Joins sheet 176)

187



(Joins sheet 186)

(Joins sheet 188)

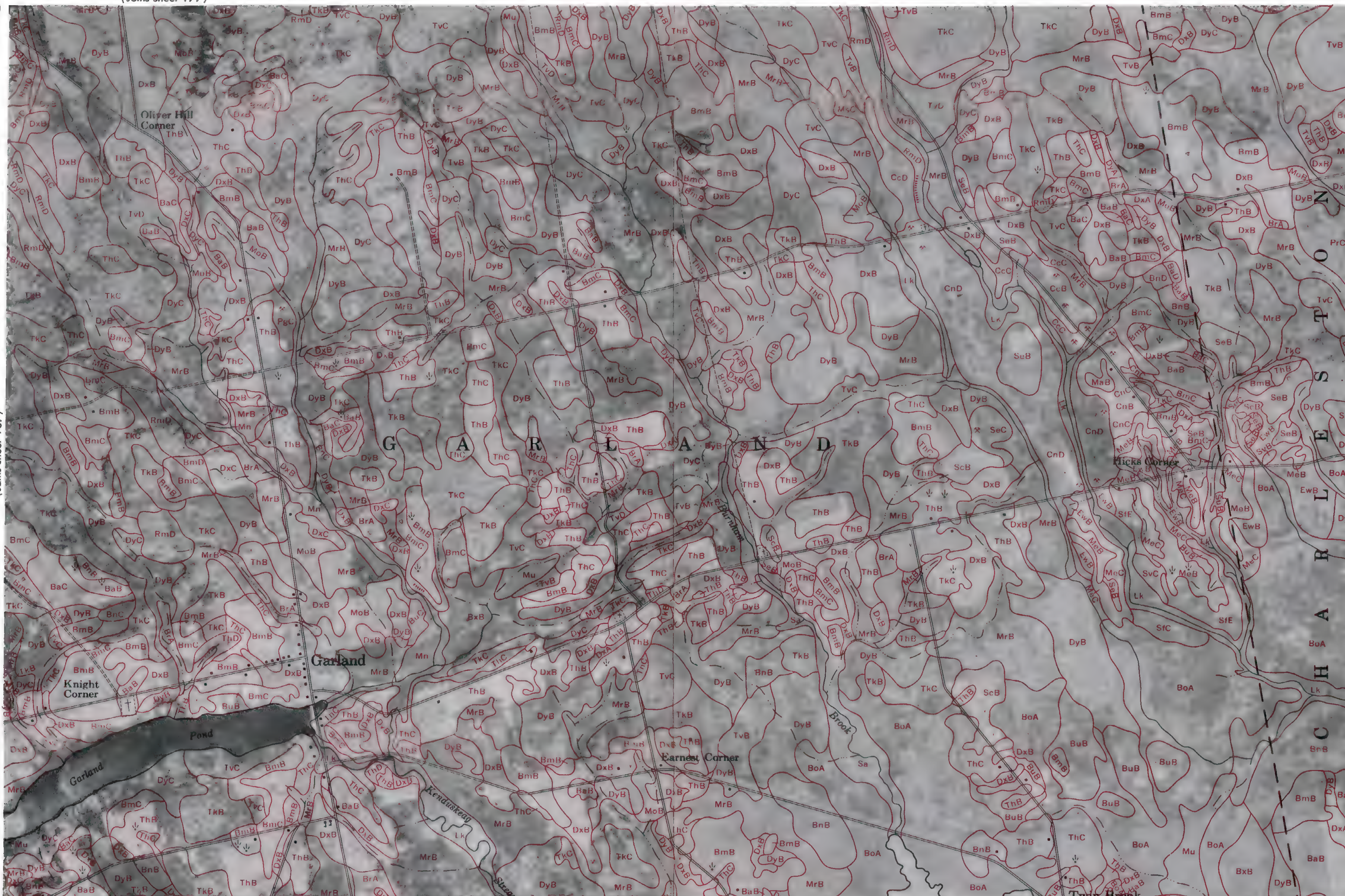
(Joins sheet 198)

0 ½ 1 Mile Scale 1:20 000 0 5000 Feet

This map is one of a set compiled in 1962, as part of a soil survey by the Soil Conservation Service, United States Department of Agriculture, and the Maine Agricultural Experiment Station.

188

(Joins sheet 177)



(Joins sheet 187)

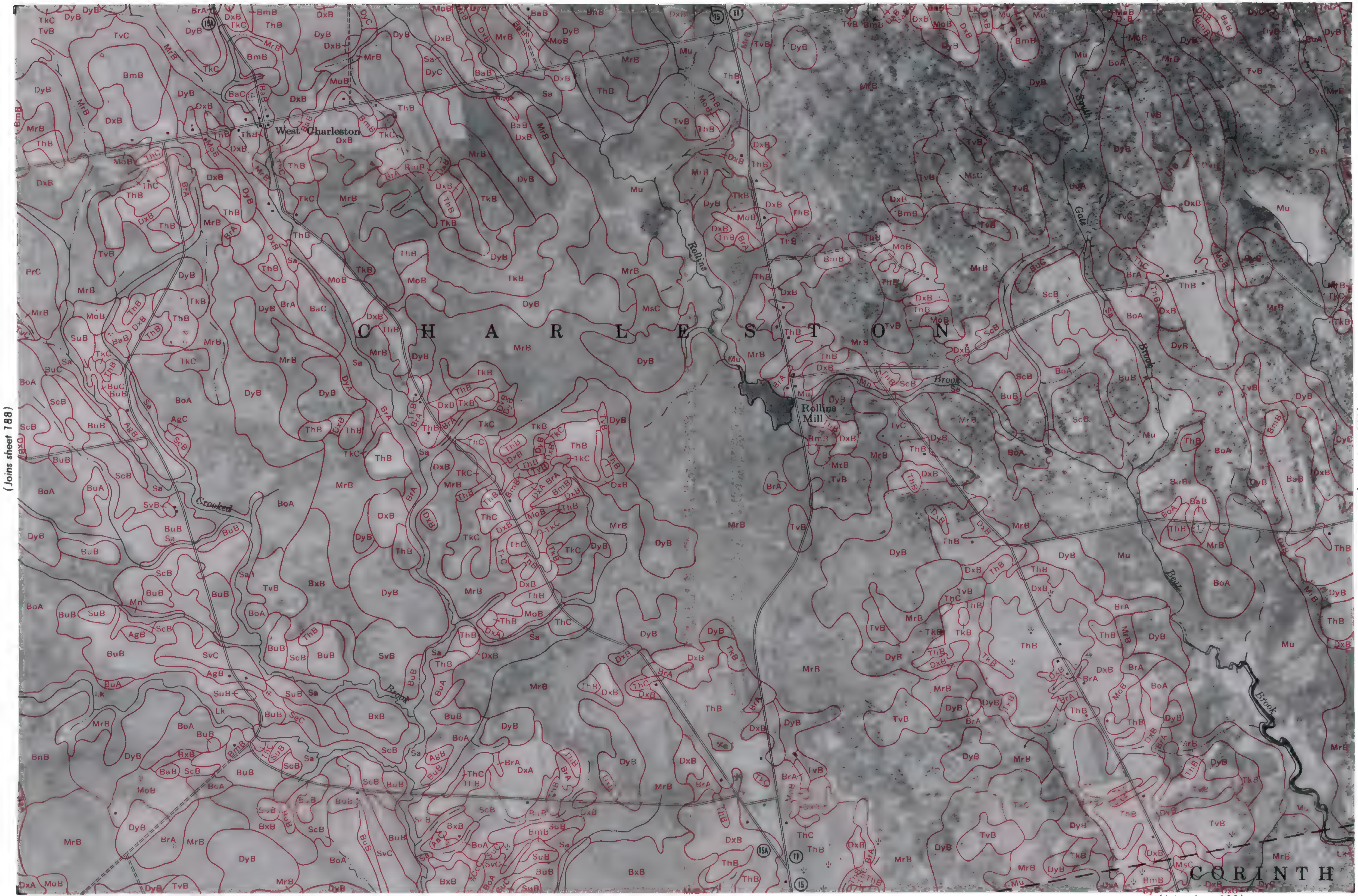
(Joins sheet 189)

(Joins sheet 199)

0 ½ 1 Mile Scale 1:20 000 0 5000 Feet

(Joins sheet 178)

(Joins sheet 188)



(Joins sheet 190)

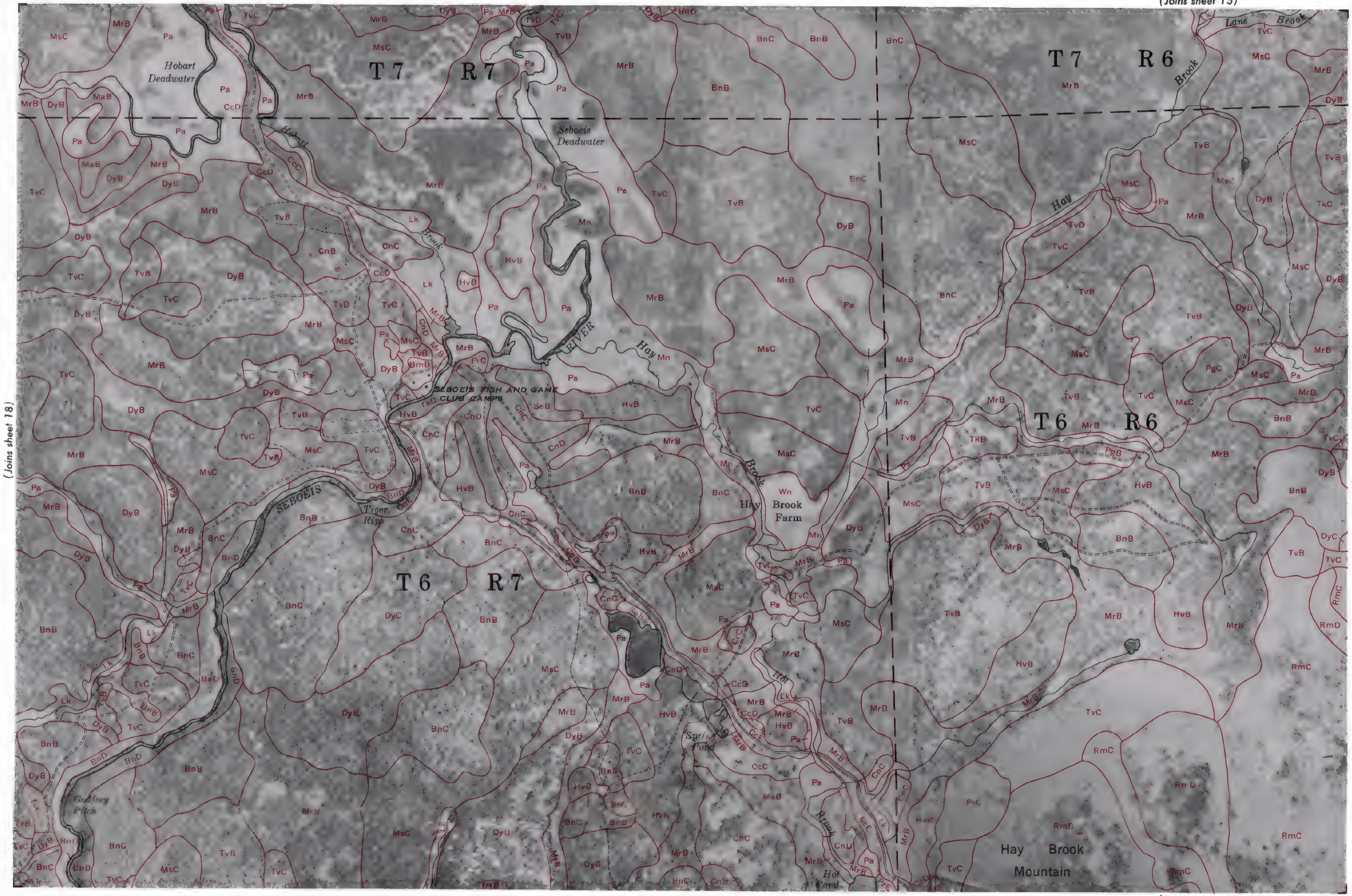
(Joins sheet 200)

0 ½ 1 Mile Scale 1:20 000 0 5000 Feet

This map is one of a set compiled in 1962, as part of a soil survey by the Soil Conservation Service, United States Department of Agriculture, and the Maine Agricultural Experiment Station.

(Joins sheet 15)

19



(Joins sheet 18)

(Joins sheet 20)

(Joins sheet 23)

0 ½ 1 Mile Scale 1:20 000 0 5000 Feet

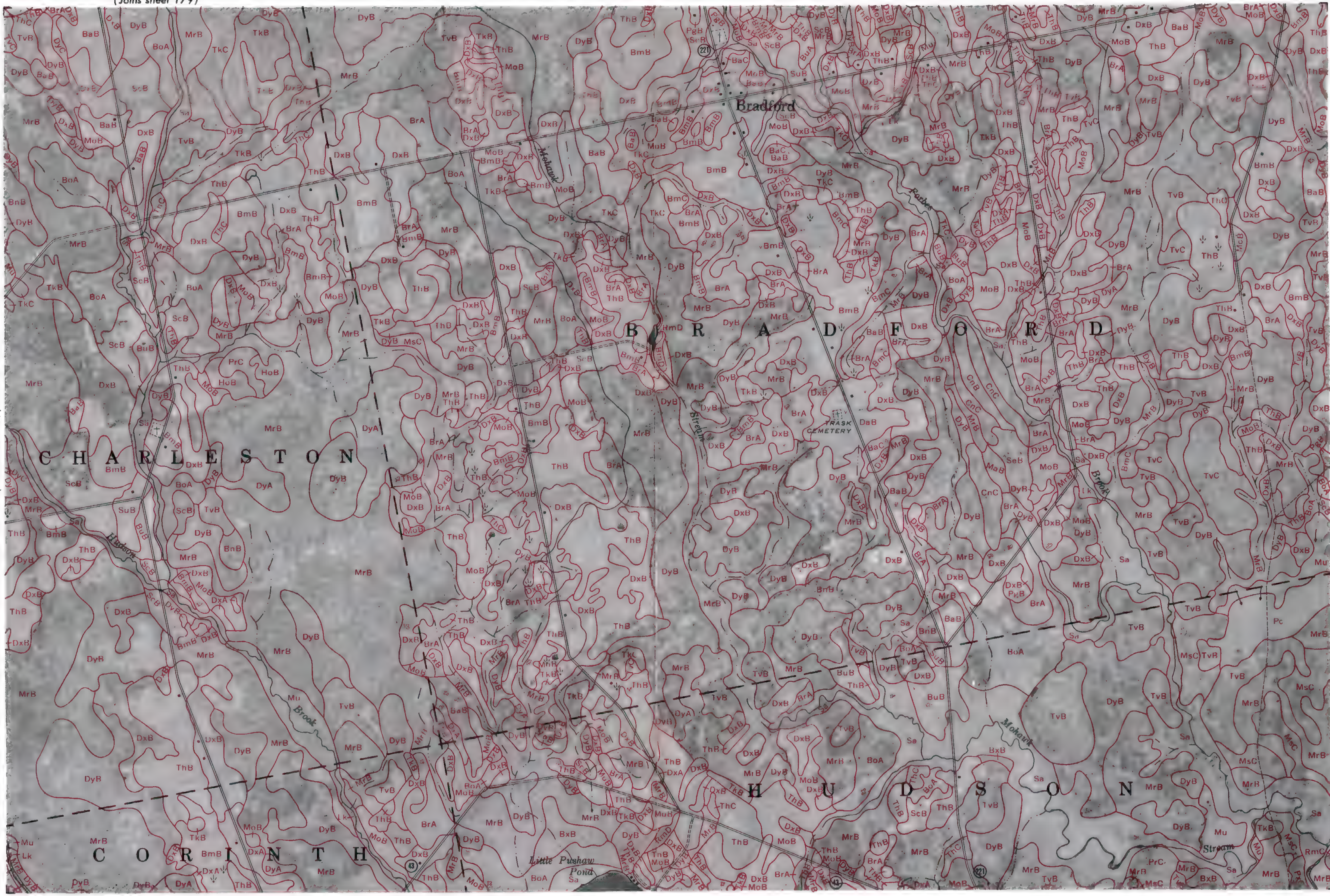
This map is one of a set compiled in 1962, as part of a soil survey by the Soil Conservation Service, United States Department of Agriculture, and the Maine Agricultural Experiment Station.

190

(Joins sheet 179)

N

(Joins sheet 189)



(Joins sheet 191)

(Joins sheet 201)

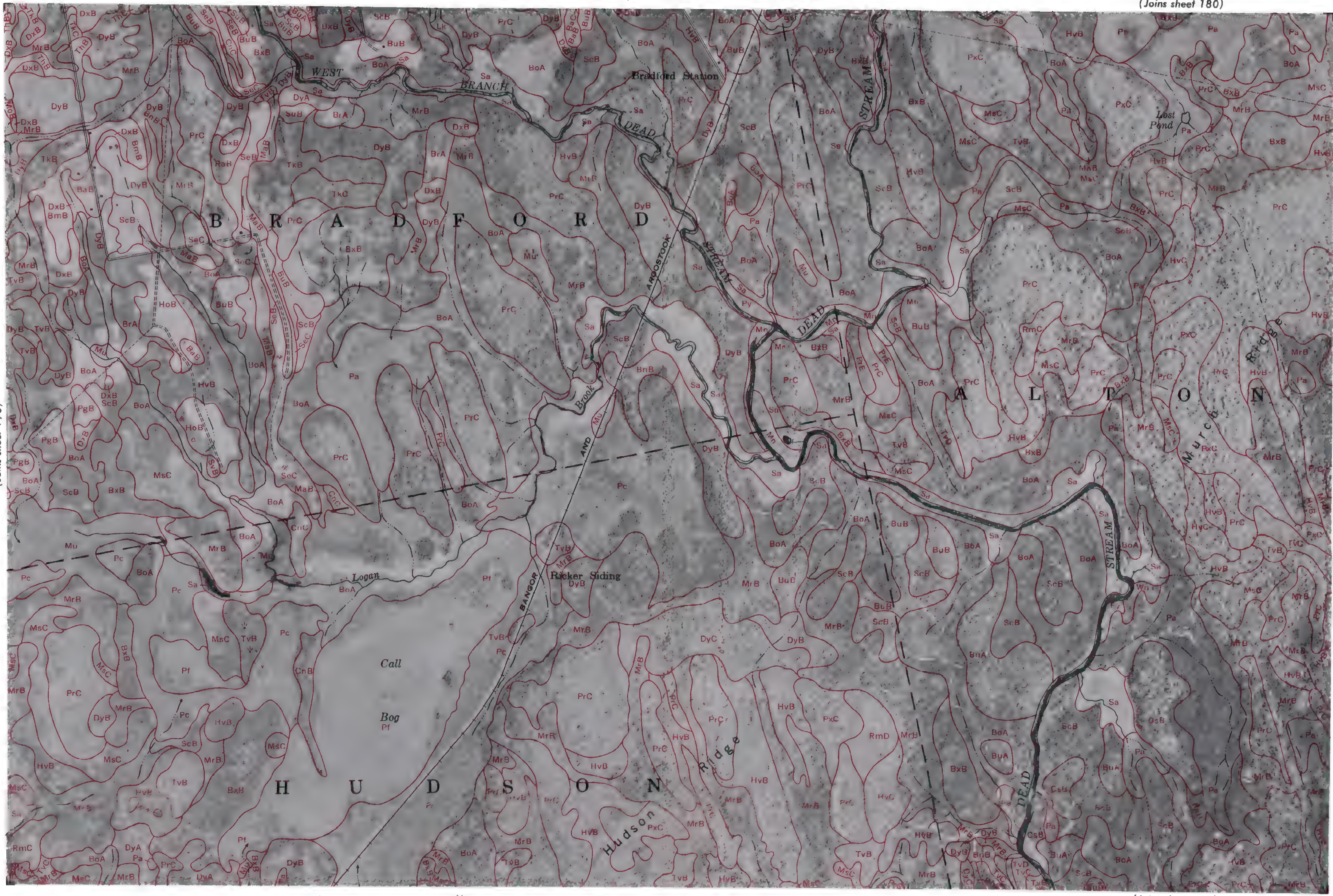
0 ½ 1 Mile

Scale 1:20 000

0 5000 Feet

(Joins sheet 180)

191



(Joins sheet 190)

(Joins sheet 192)

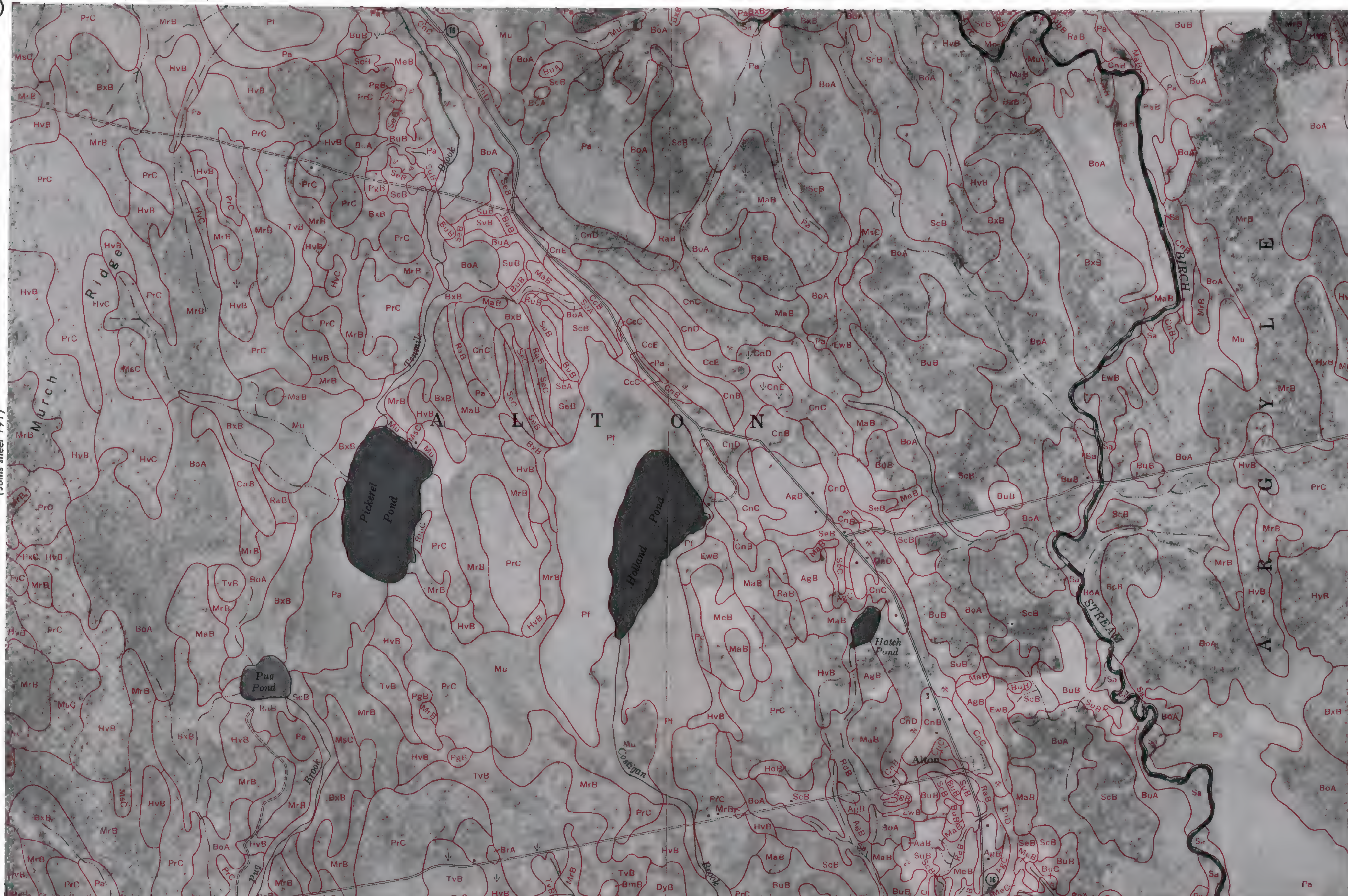
(Joins sheet 202)

0 ½ 1 Mile Scale 1:20 000 0 5000 Feet

This map is one of a set compiled in 1962, as part of a soil survey by the Soil Conservation Service, United States Department of Agriculture, and the Maine Agricultural Experiment Station.

(Joins sheet 181)

(Joins sheet 191)



(Joins sheet 193)

(Joins sheet 203)

0 ½ 1 Mile Scale 1:20 000 0 5000 Feet

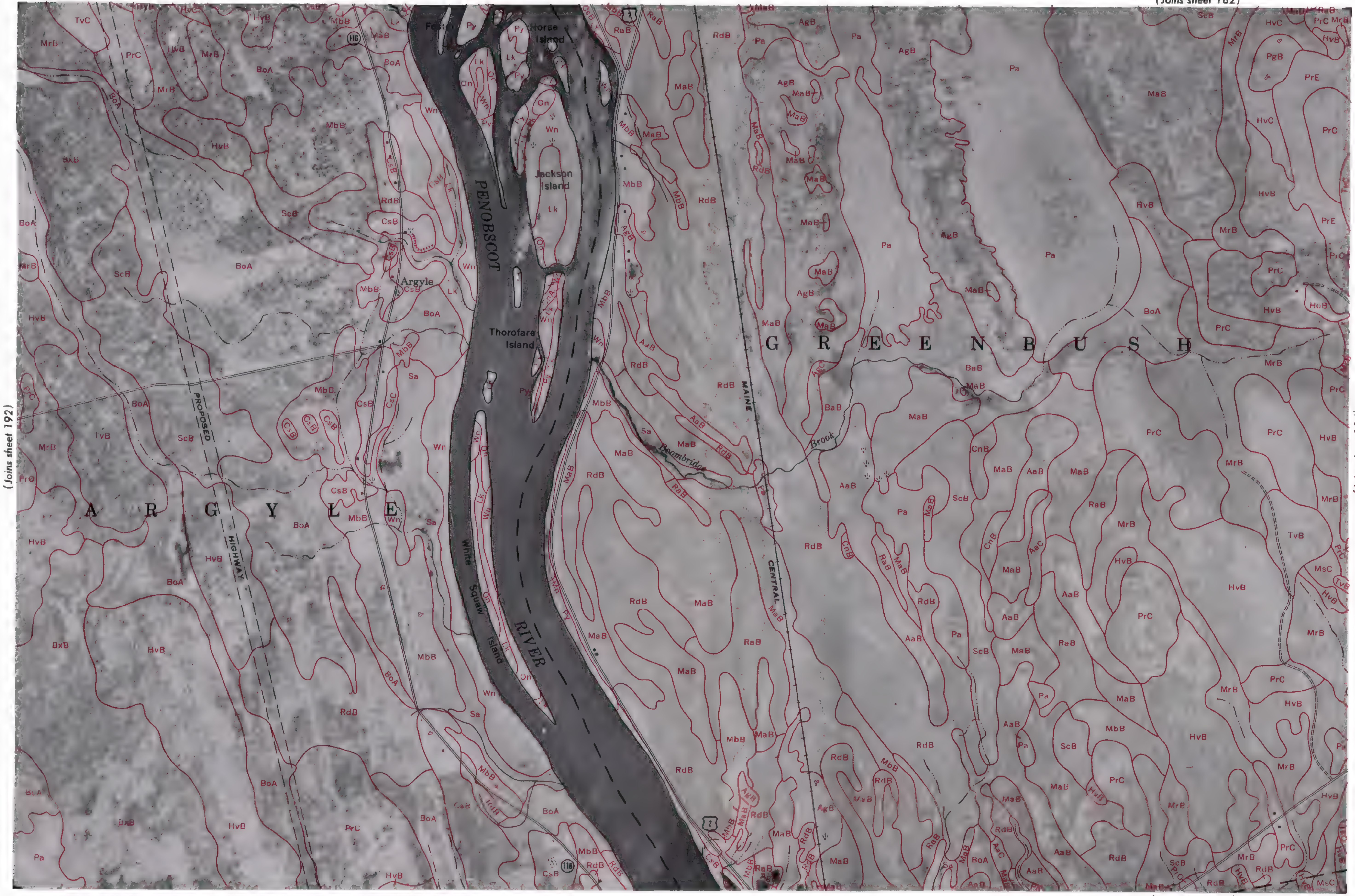
(Joins sheet 182)

193

N

This map is one of a set compiled in 1962, as part of a soil survey by the Soil Conservation Service, United States Department of Agriculture, and the Maine Agricultural Experiment Station.

(Joins sheet 192)



(Joins sheet 194)

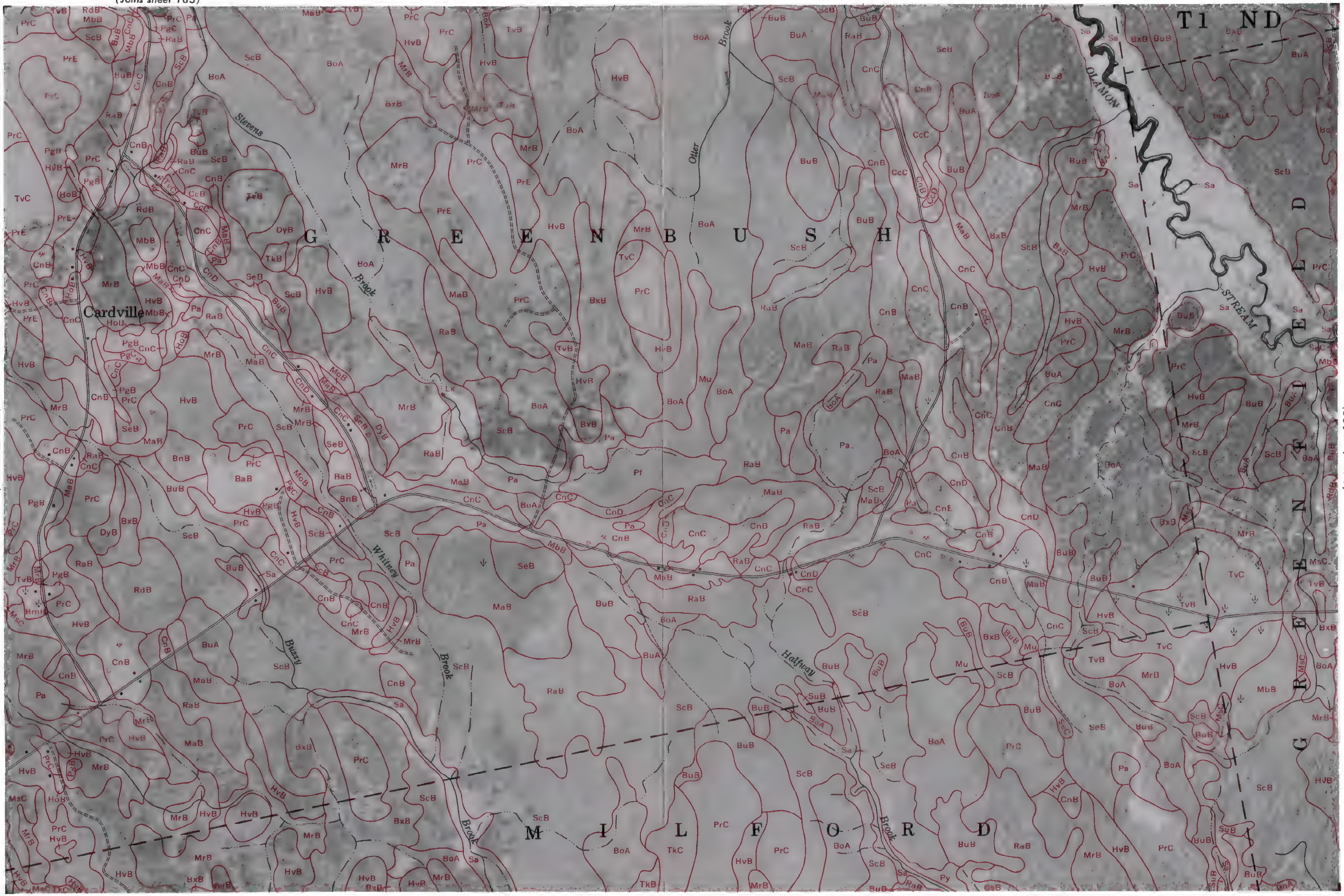
(Joins sheet 204)

0 ½ 1 Mile Scale 1:20 000 0 5000 Feet

194

(Joins sheet 183)

(Joins sheet 193)



(Joins sheet 195)

(Joins sheet 205)

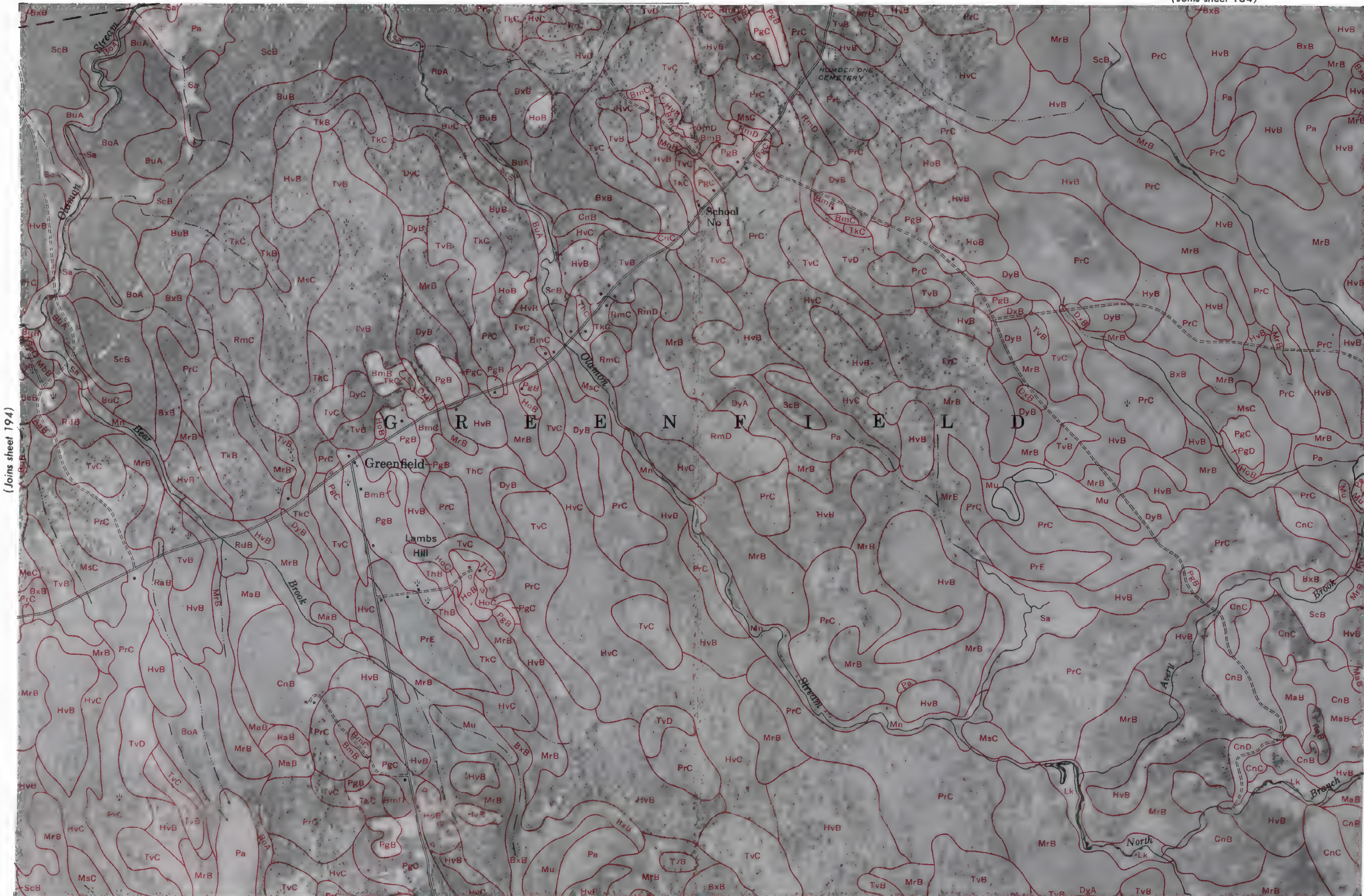
0 ½ 1 Mile Scale 1:20 000 0 5000 Feet

(Joins sheet 184)

195

N

(Joins sheet 194)



(Joins sheet 196)

(Joins sheet 206)

0 ½ 1 Mile Scale 1:20 000 0 5000 Feet

This map is one of a set compiled in 1962, as part of a soil survey by the Soil Conservation Service, United States Department of Agriculture, and the Maine Agricultural Experiment Station.

196

N

(Joins sheet 185)

(Joins sheet 195)

(Joins upper right)

(Joins lower left)

(Joins sheet 206)

0 ½ 1 Mile

Scale 1:20 000

0 5000 Feet

(Joins sheet 186)

197

(Joins sheet 198)

(Joins sheet 207)

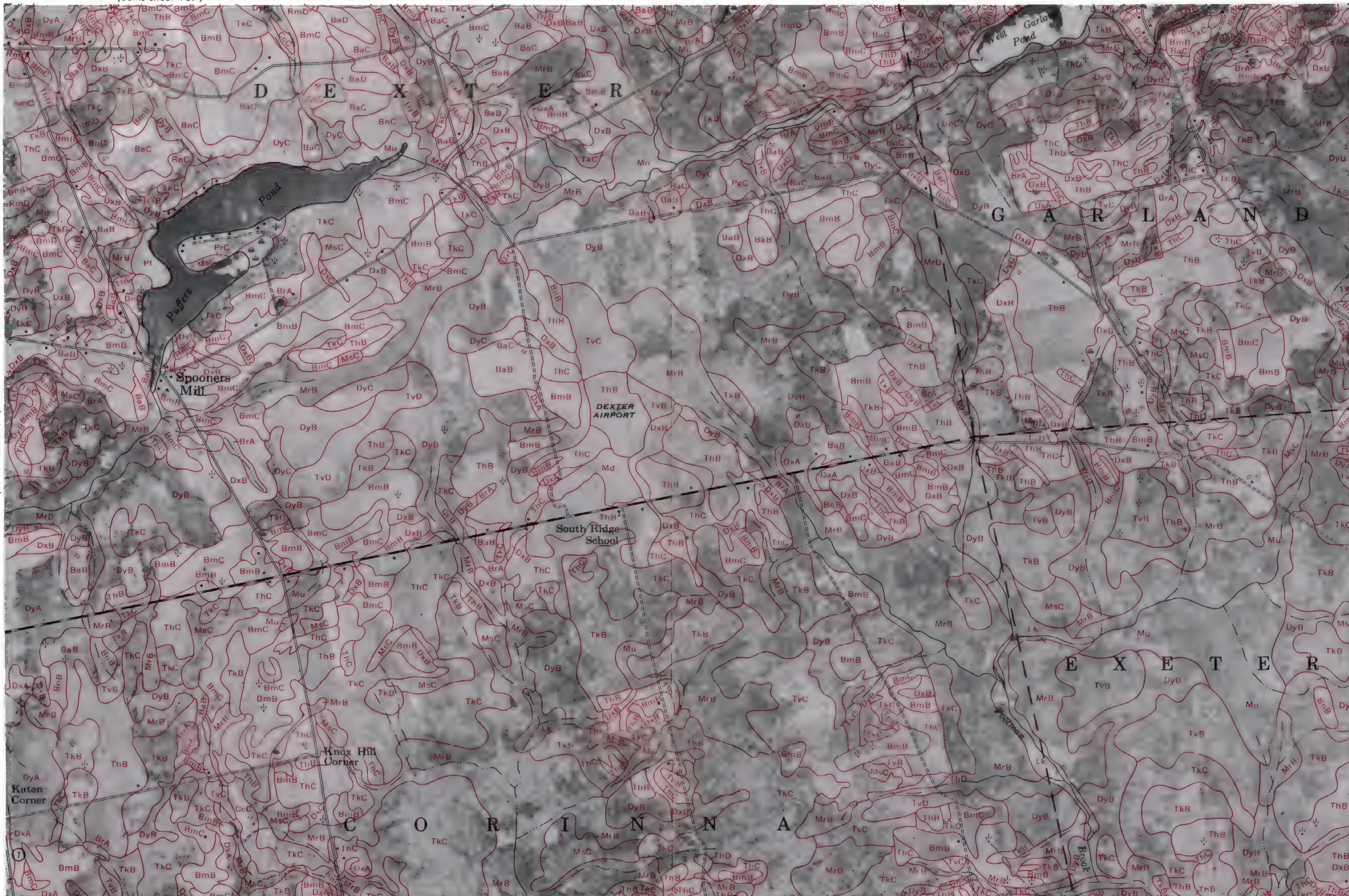
0 ½ 1 Mile Scale 1:20 000 0 5000 Feet

This map is one of a set compiled in 1962, as part of a soil survey by the Soil Conservation Service, United States Department of Agriculture, and the Maine Agricultural Experiment Station.

198

(Joins sheet 187)

(Joins sheet 197)



(Joins sheet 199)

(Joins sheet 208)

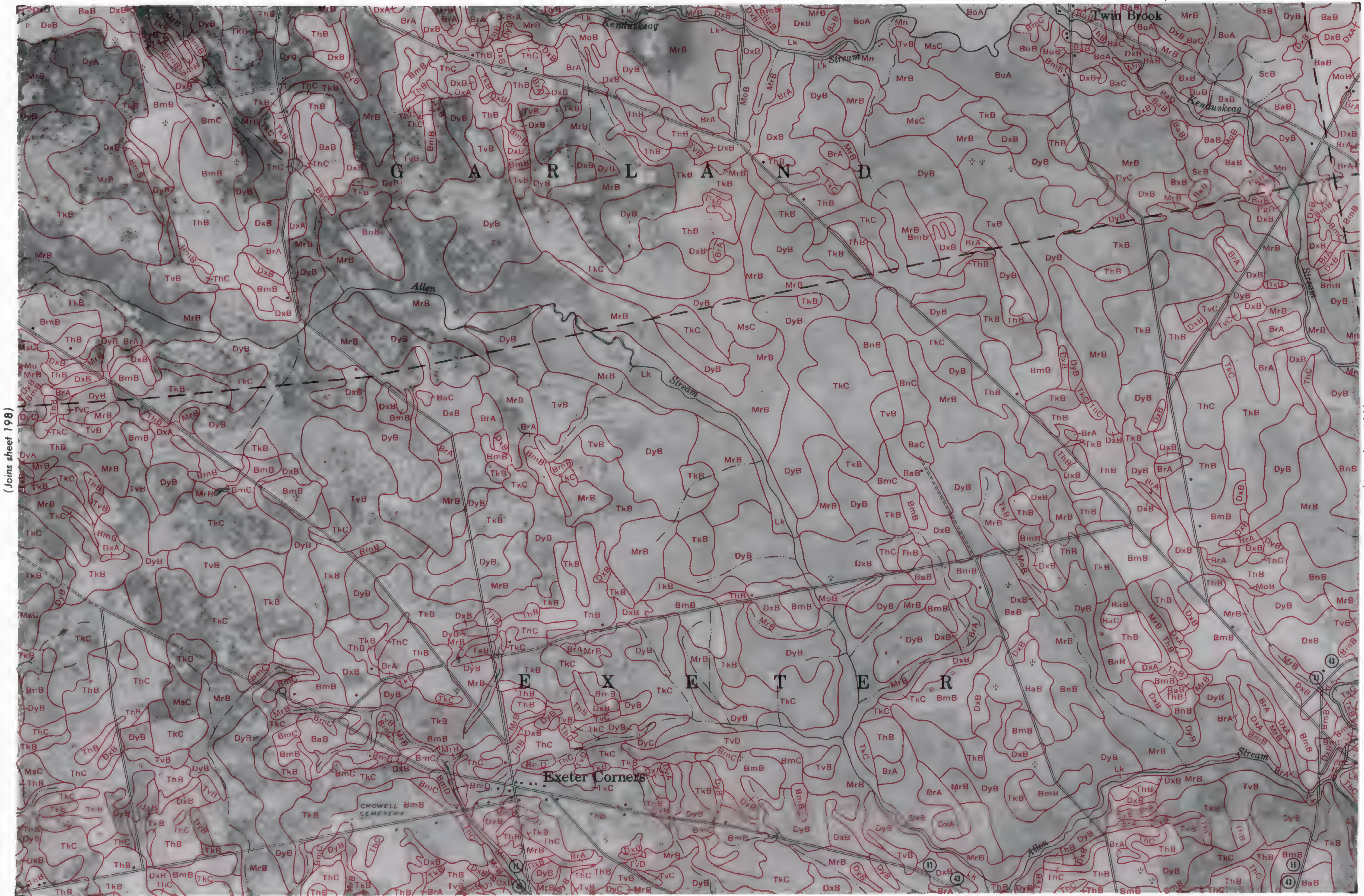
0 ½ 1 Mile

Scale 1:20 000

0 5000 Feet

(Joins sheet 188)

(Joins sheet 198)

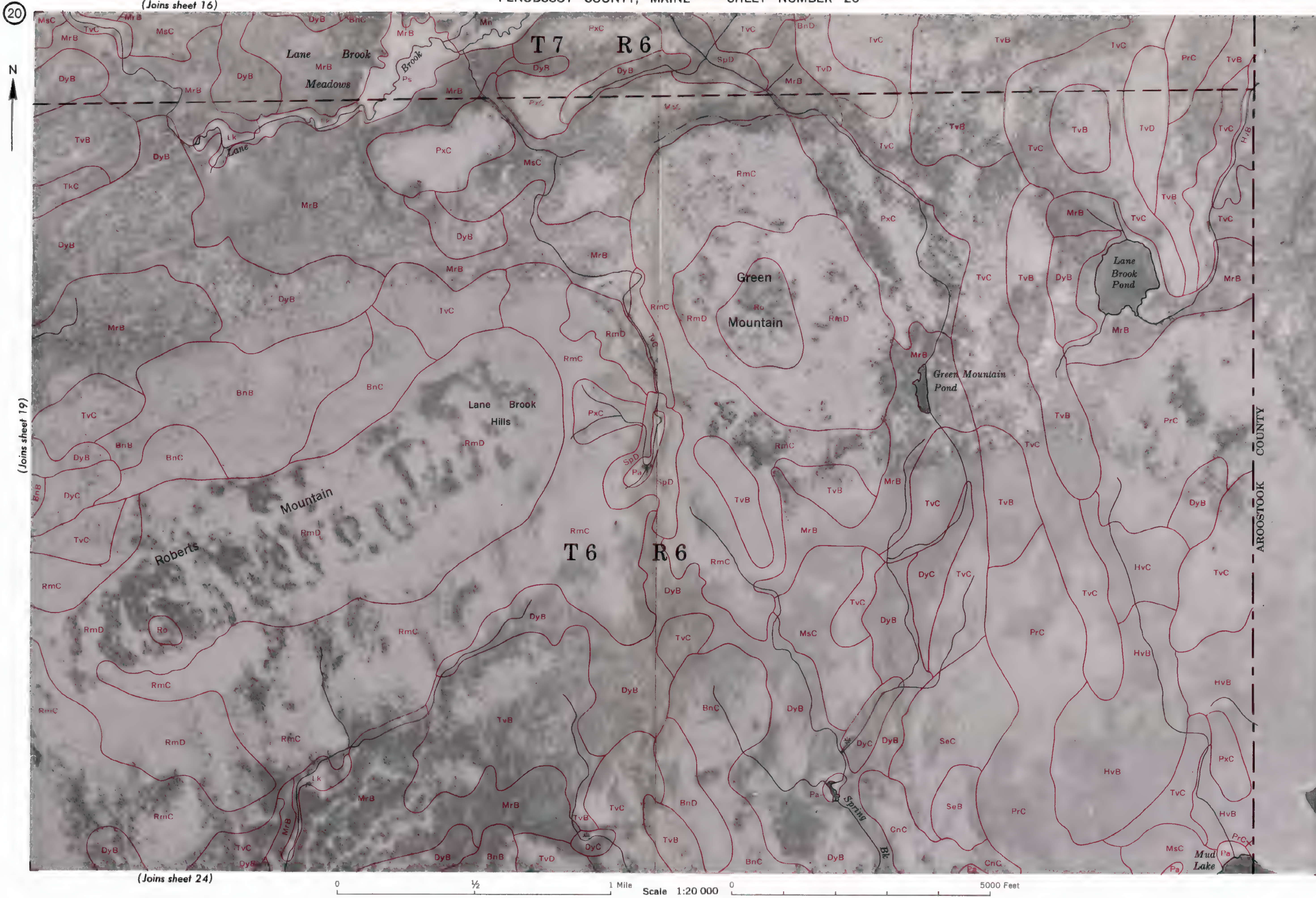


(Joins sheet 200)

(Joins sheet 209)

0 ½ 1 Mile Scale 1:20 000 0 5000 Feet

This map is one of a set compiled in 1962, as part of a soil survey by the Soil Conservation Service, United States Department of Agriculture, and the Maine Agricultural Experiment Station.


20
(Joins sheet 16)
N
T 7 R 6
Lane Brook Meadows
Lane Brook
Green Mountain
Lane Brook Pond
Green Mountain Pond
Lane Brook Hills
Roberts Mountain
T 6 R 6
Spring Bk
Mud Lake
(Joins sheet 19)
AROOSTOOK COUNTY
(Joins sheet 24)
0 ½ 1 Mile
Scale 1:20 000
0 5000 Feet

200

N

(Joins sheet 189)

(Joins sheet 199)

(Joins sheet 201)

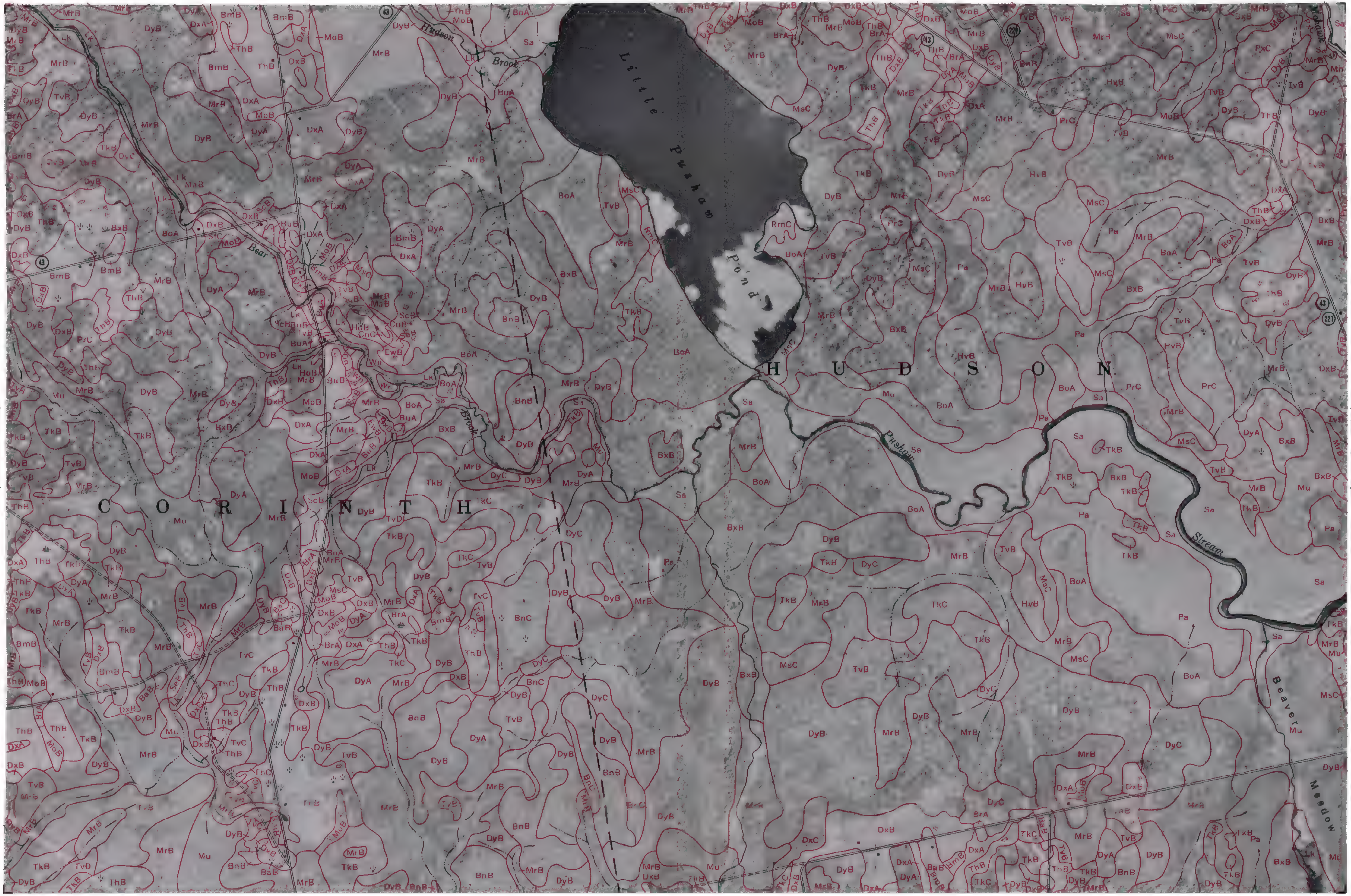
(Joins sheet 210)

0 ½ 1 Mile Scale 1:20 000 0 5000 Feet

(Joins sheet 190)

201

(Joins sheet 200)



(Joins sheet 202)

(Joins sheet 211)

0 ½ 1 Mile Scale 1:20 000 0 5000 Feet

This map is one of a set compiled in 1962, as part of a soil survey by the Soil Conservation Service, United States Department of Agriculture, and the Maine Agricultural Experiment Station.

(Joins sheet 191)

N

(Joins sheet 201)

(Joins sheet 203)

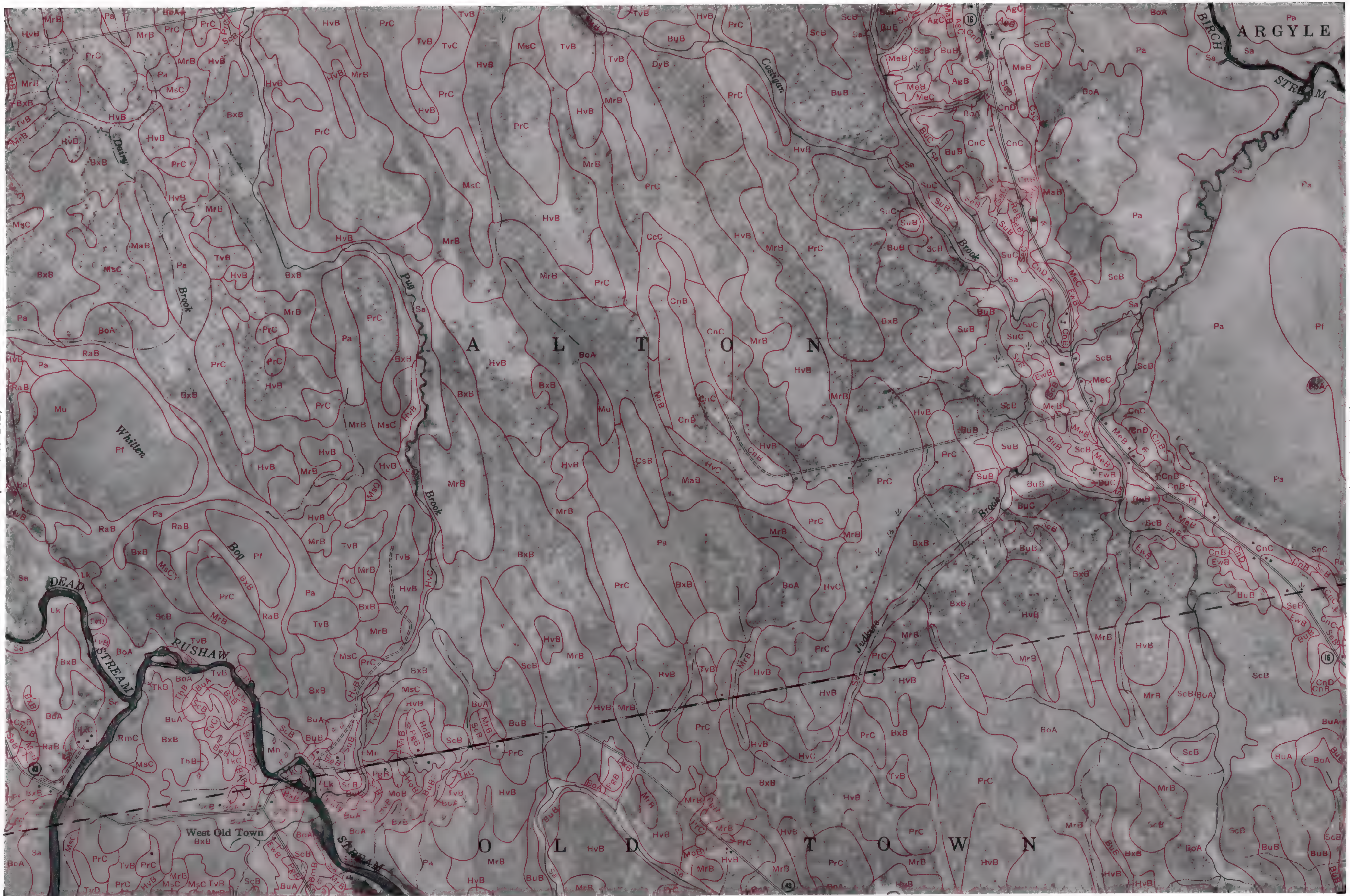
(Joins sheet 212)

0 ½ 1 Mile Scale 1:20 000 0 5000 Feet

203

(Joins sheet 192)

(Joins sheet 202)



(Joins sheet 204)

(Joins sheet 213)

0 ½ 1 Mile Scale 1:20 000 0 5000 Feet

This map is one of a set compiled in 1962, as part of a soil survey by the Soil Conservation Service, United States Department of Agriculture, and the Maine Agricultural Experiment Station.

204

(Joins sheet 193)

(Joins sheet 203)

(Joins sheet 205)

(Joins sheet 214)

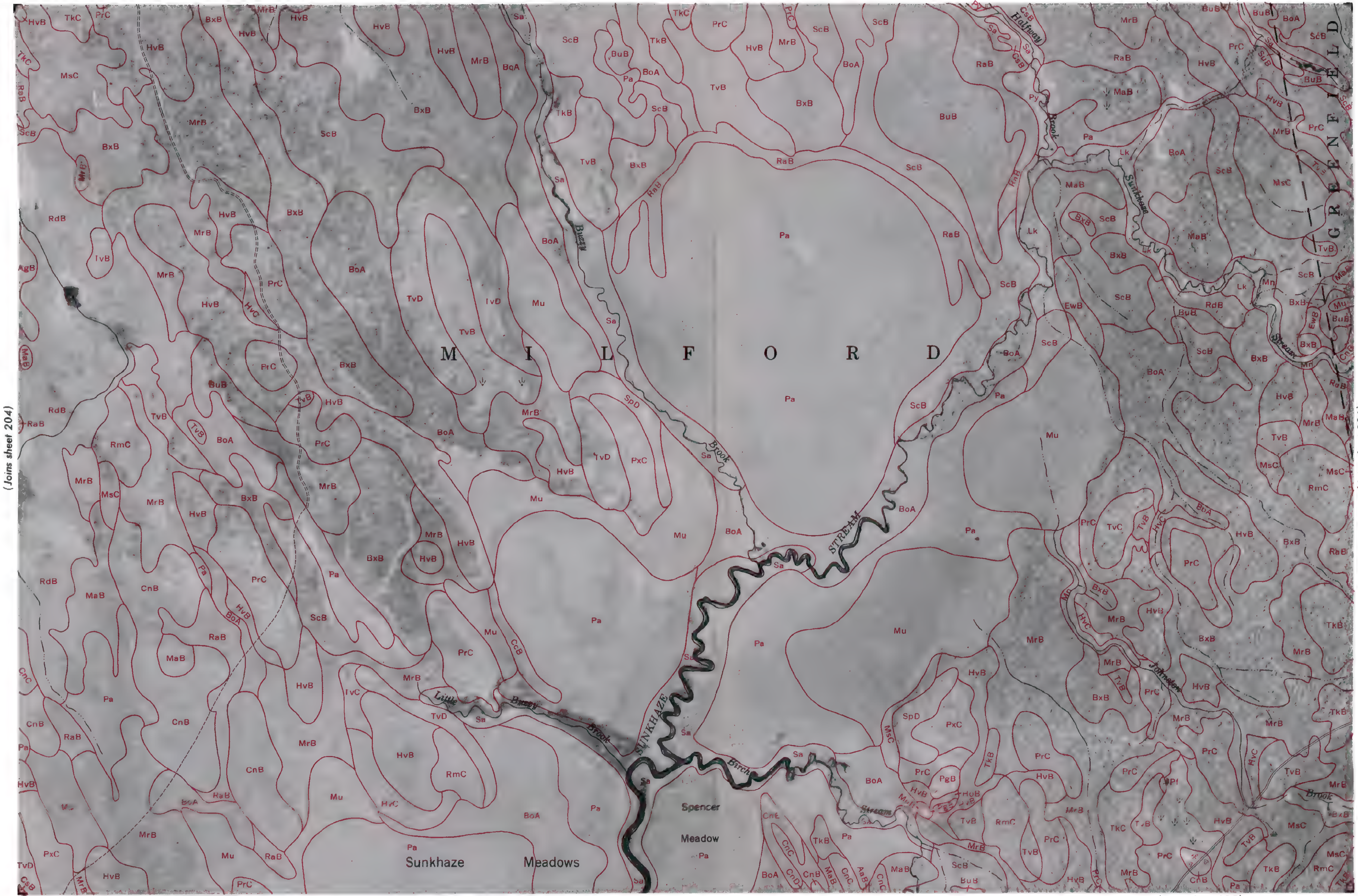
0 ½ 1 Mile Scale 1:20 000 0 5000 Feet

(Joins sheet 194)

205

This map is one of a set compiled in 1962, as part of a soil survey by the Soil Conservation Service, United States Department of Agriculture, and the Maine Agricultural Experiment Station.

(Joins sheet 204)

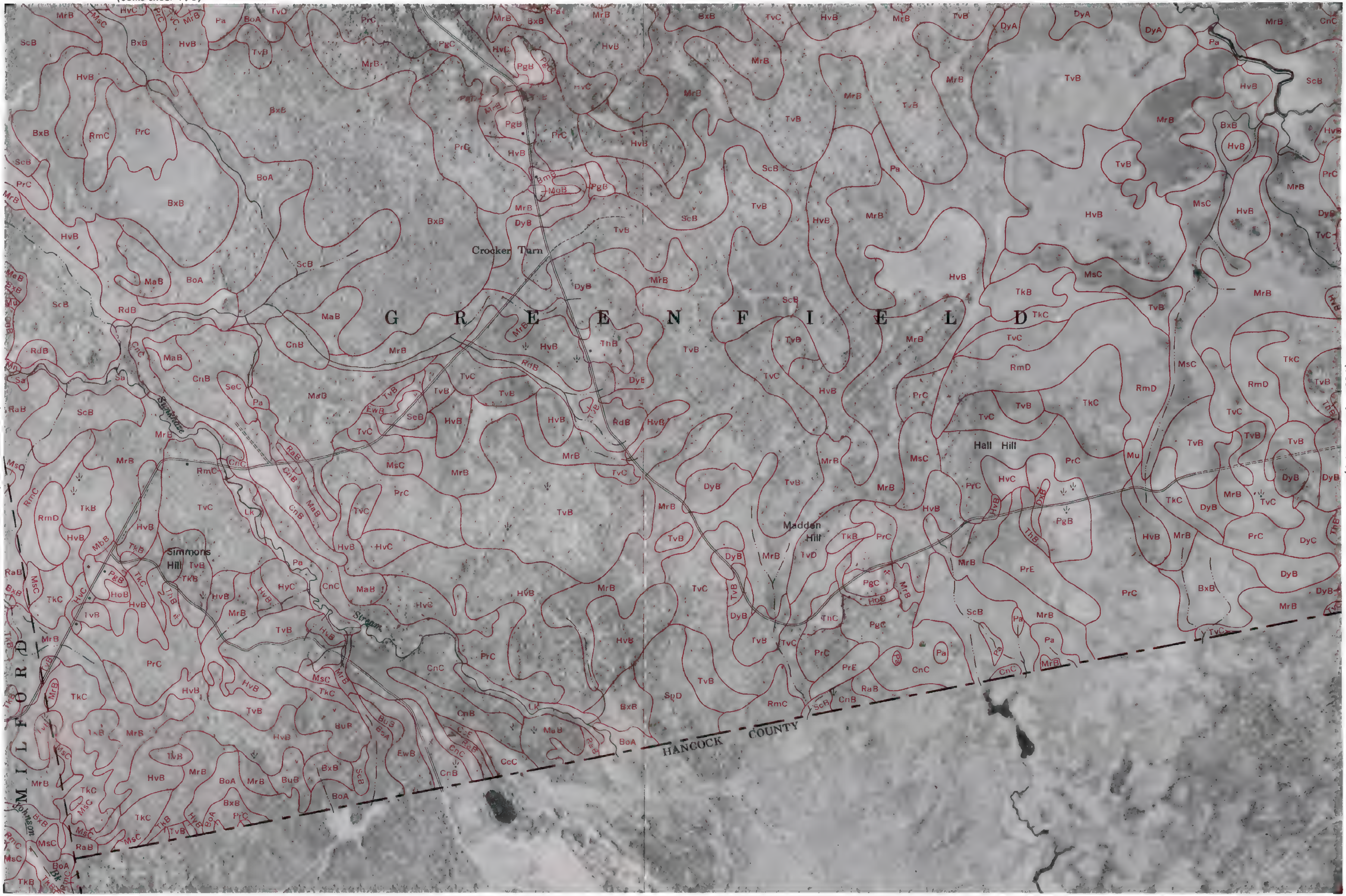


(Joins sheet 206)

(Joins sheet 215)

0 ½ 1 Mile Scale 1:20 000 0 5000 Feet

(Joins sheet 195)



(Joins sheet 205)

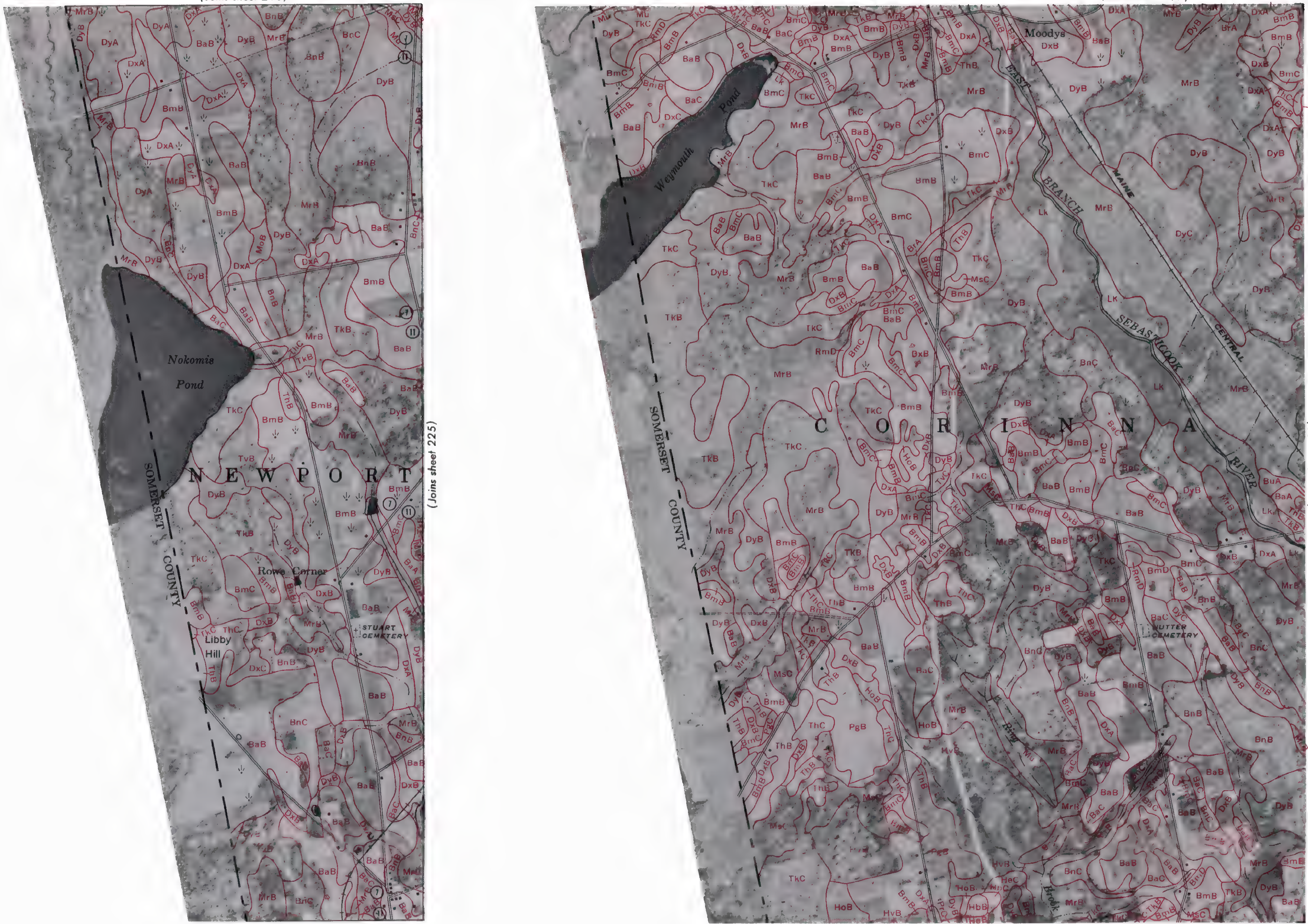
(Joins inset, sheet 196)

(Joins inset, sheet 242)

0 ½ 1 Mile Scale 1:20 000 0 5000 Feet

(Joins sheet 216)

(Joins sheet 197)



(Joins sheet 225)

(Joins sheet 208)

(Joins inset, sheet 216)

(Joins sheet 216)

0 ½ 1 Mile Scale 1:20 000 0 5000 Feet

This map is one of a set compiled in 1962, as part of a soil survey by the Soil Conservation Service, United States Department of Agriculture, and the Maine Agricultural Experiment Station.

208

PENOBSCOT COUNTY, MAINE — SHEET NUMBER 208

(Joins sheet 198)

(Joins sheet 207)

(Joins sheet 209)

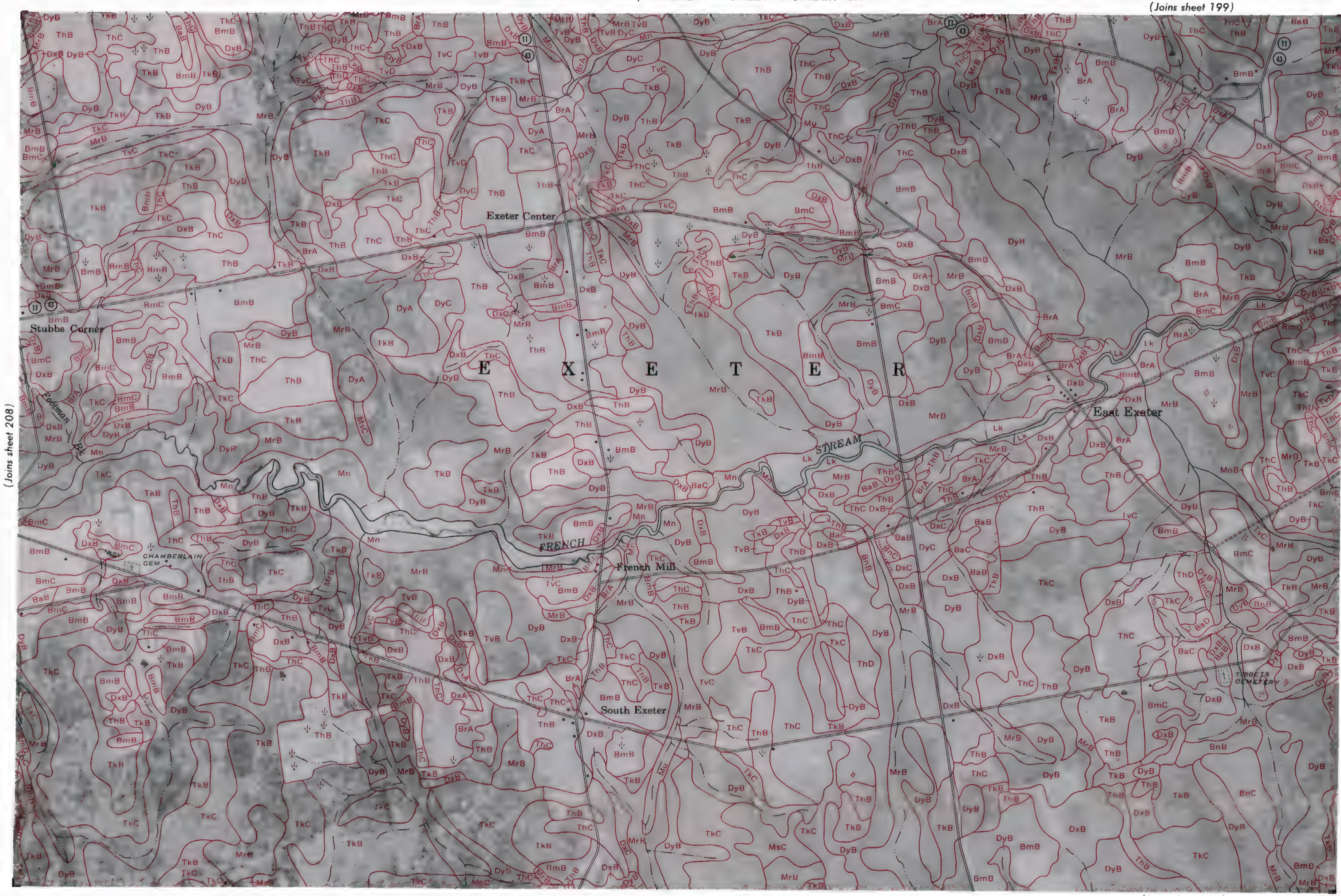
(Joins sheet 217)

0 ½ 1 Mile Scale 1:20 000 0 5000 Feet

(Joins sheet 199)

209

(Joins sheet 208)



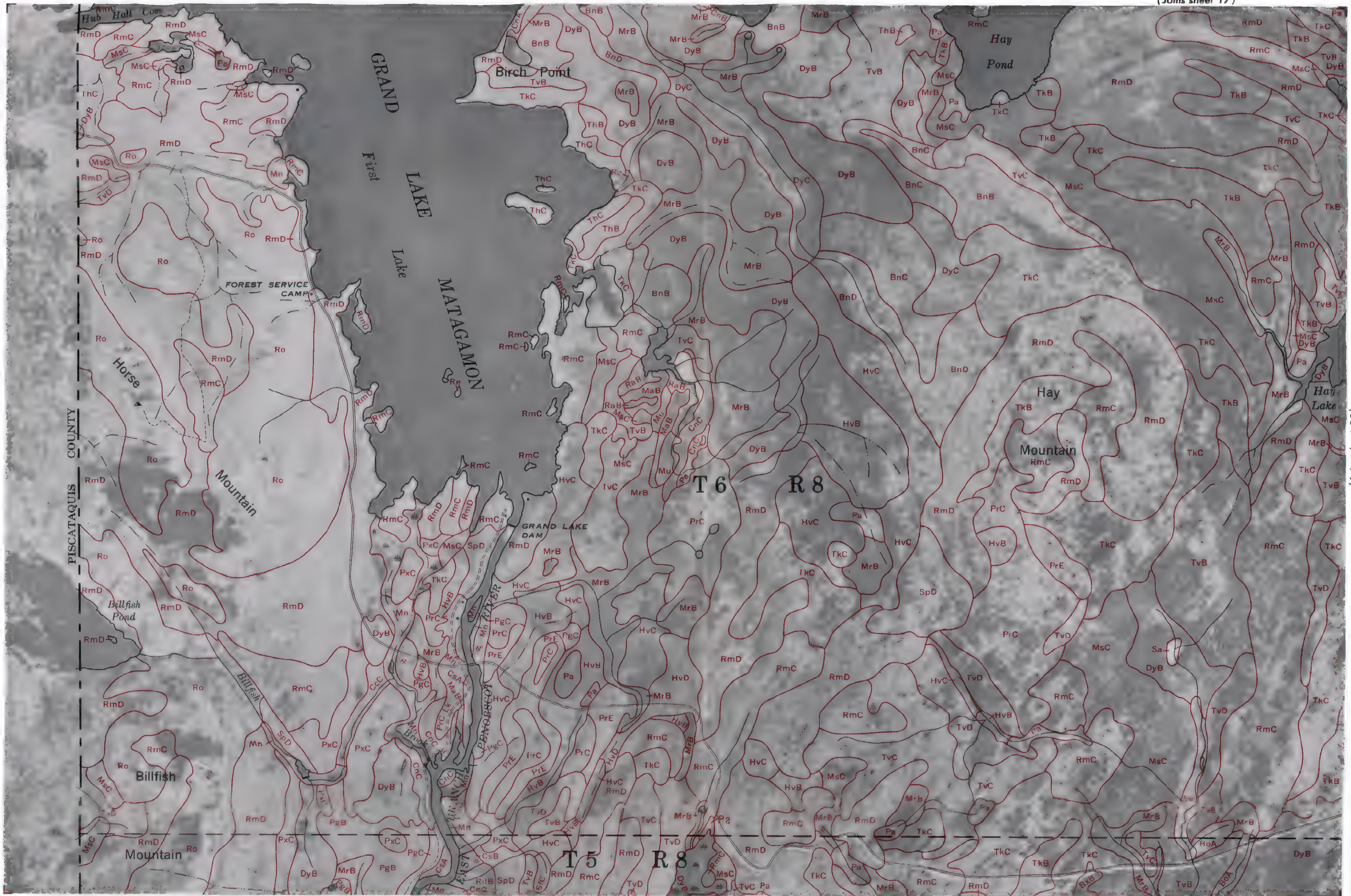
(Joins sheet 210)

0 ½ 1 Mile Scale 1:20 000 0 5000 Feet

(Joins sheet 218)

This map is one of a set compiled in 1962, as part of a soil survey by the Soil Conservation Service, United States Department of Agriculture, and the Maine Agricultural Experiment Station.

(Joins sheet 17)



(Joins sheet 22)

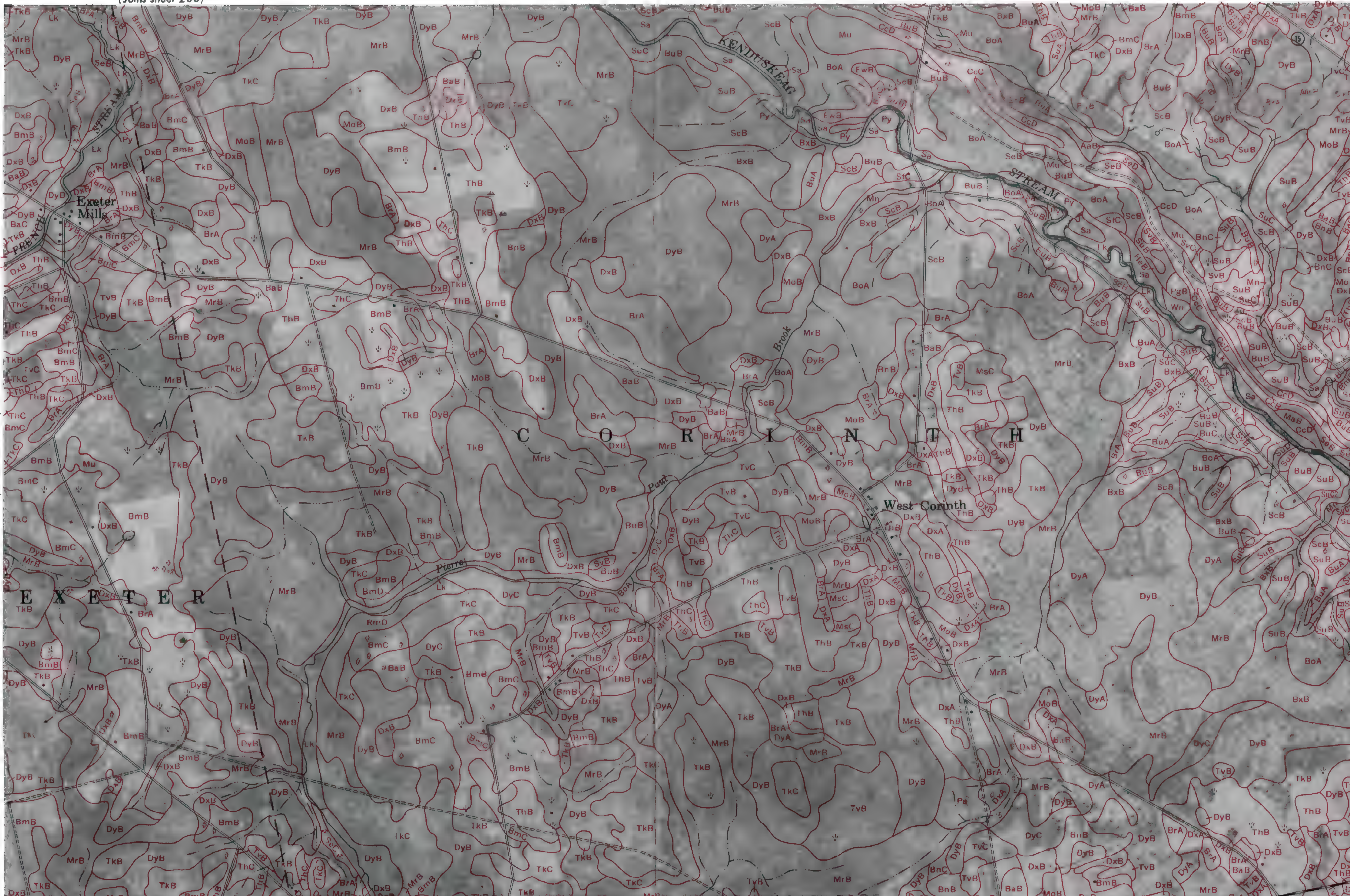
(Joins sheet 25)

0 ½ 1 Mile Scale 1:20 000 0 5000 Feet

This map is one of a set compiled in 1962, as part of a soil survey by the Soil Conservation Service, United States Department of Agriculture, and the Maine Agricultural Experiment Station.

210

(Joins sheet 200)



(Joins sheet 209)

(Joins sheet 211)

(Joins sheet 219)

0 ½ 1 Mile

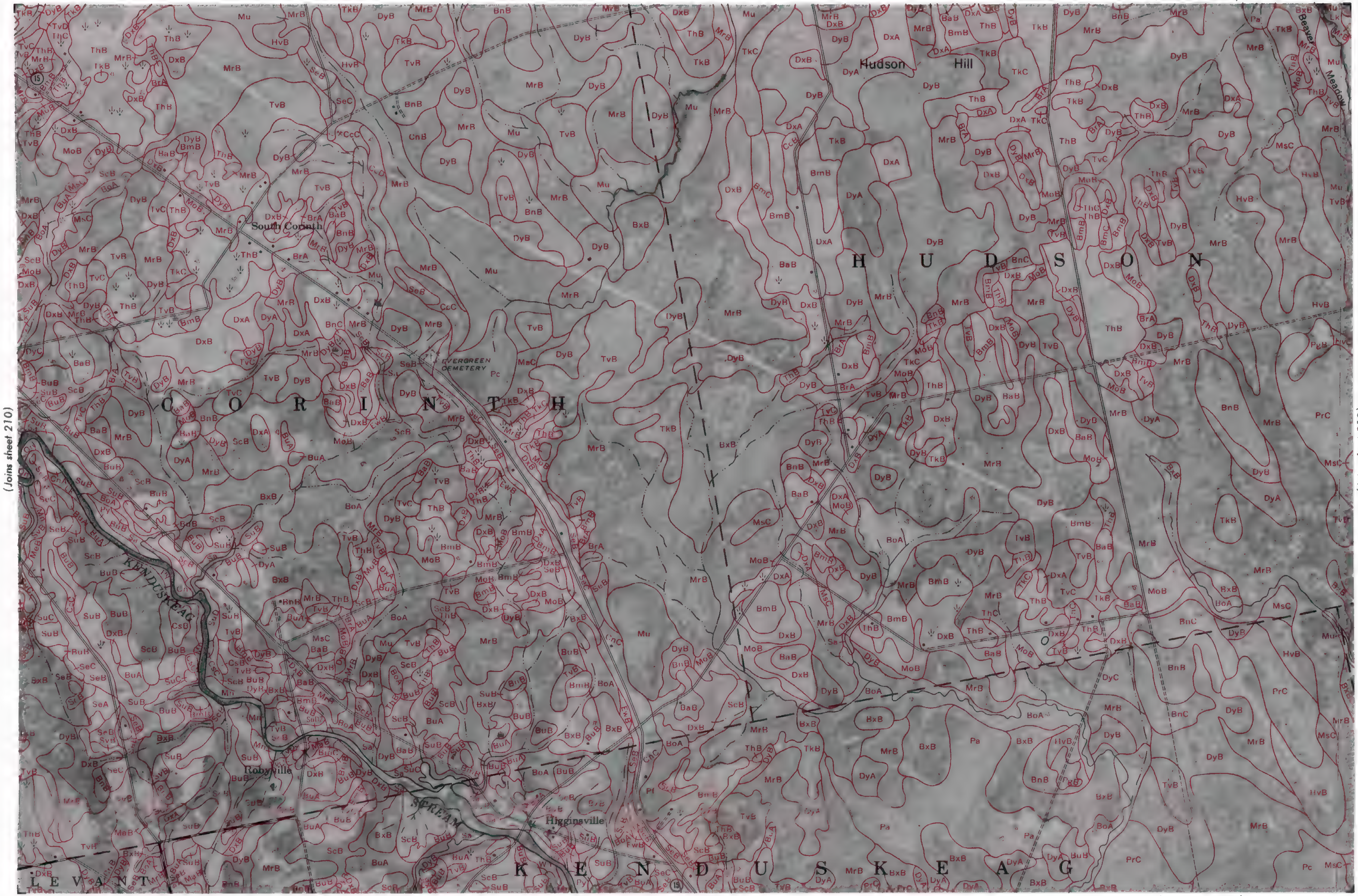
Scale 1:20 000

0 5000 Feet

(Joins sheet 201)

211

(Joins sheet 210)



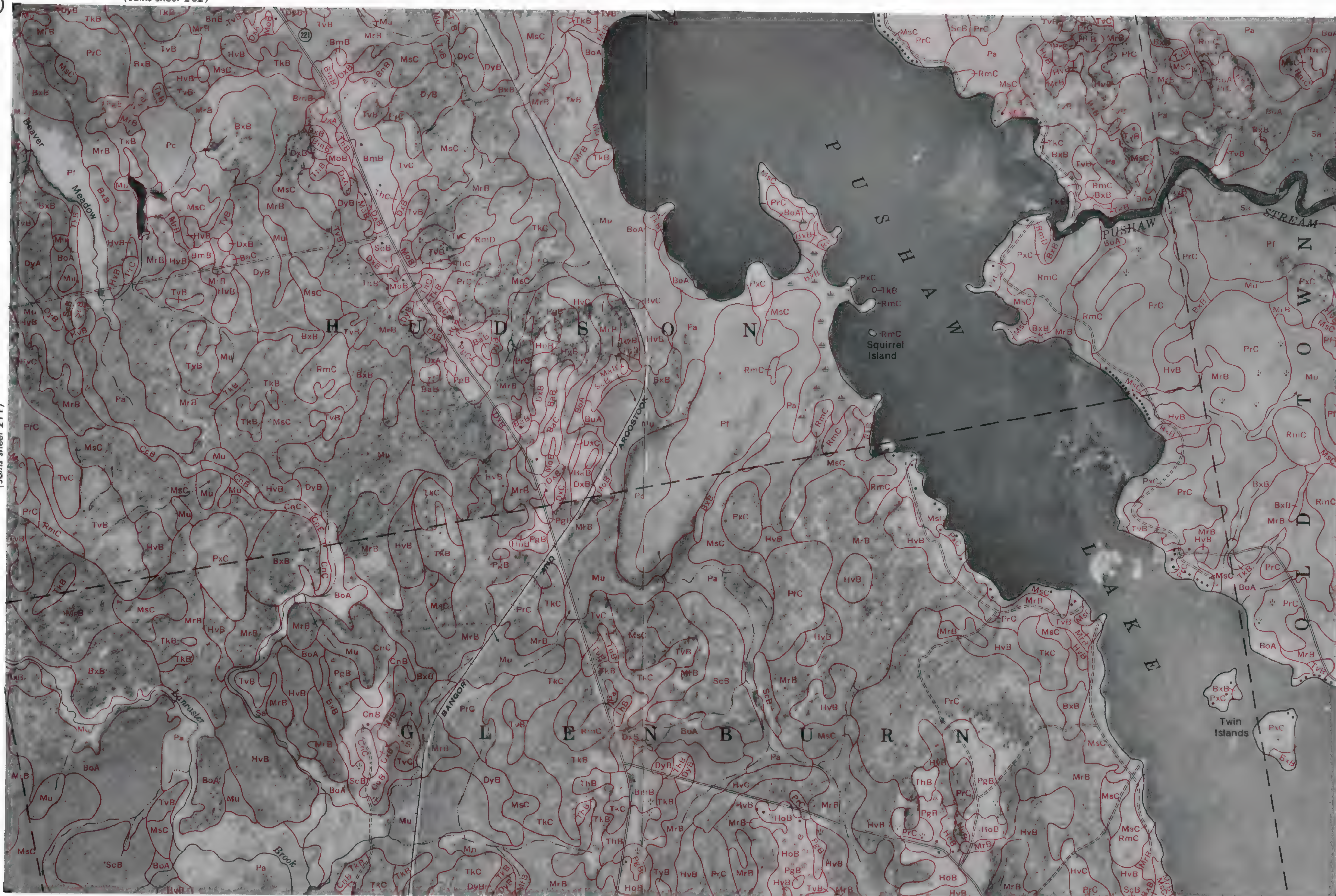
(Joins sheet 212)

(Joins sheet 220)

0 ½ 1 Mile Scale 1:20 000 0 5000 Feet

This map is one of a set compiled in 1962, as part of a soil survey by the Soil Conservation Service, United States Department of Agriculture, and the Maine Agricultural Experiment Station.

(Joins sheet 202)



(Joins sheet 211)

(Joins sheet 213)

(Joins sheet 221)

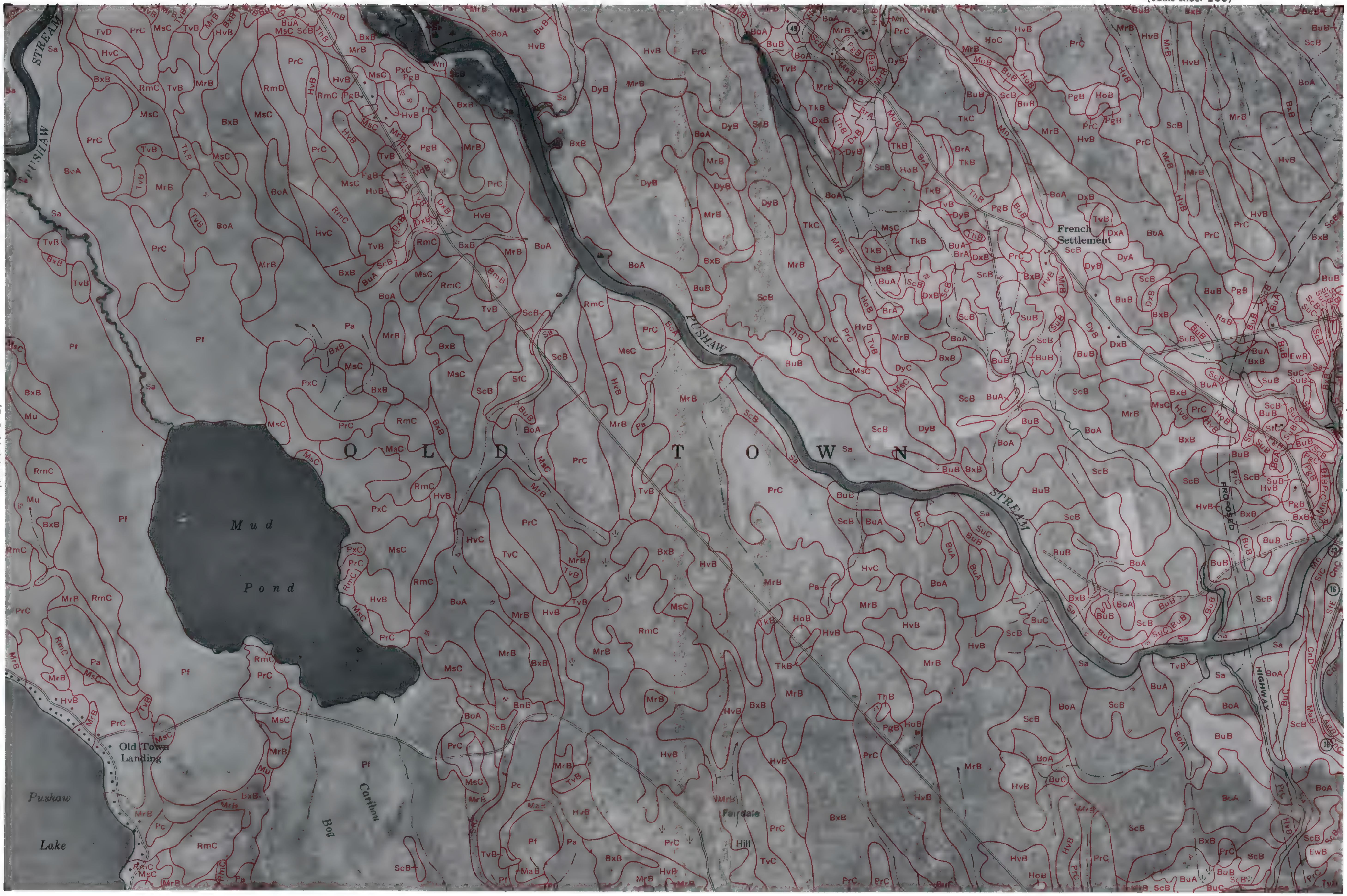
0 ½ 1 Mile Scale 1:20 000 0 5000 Feet

(Joins sheet 203)

213

N

(Joins sheet 212)



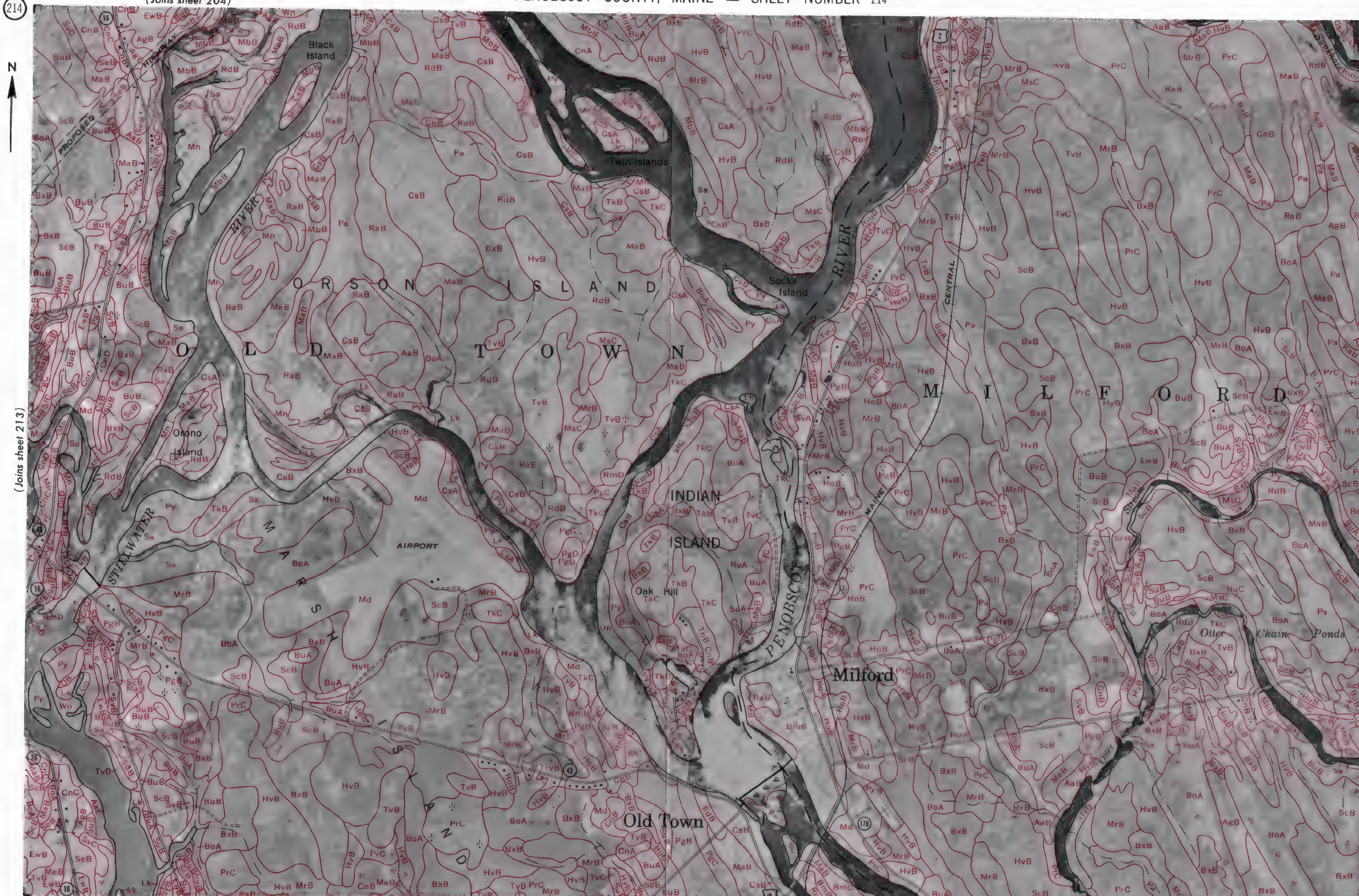
(Joins sheet 214)

(Joins sheet 222)

0 ½ 1 Mile Scale 1:20 000 0 5000 Feet

This map is one of a set compiled in 1962, as part of a soil survey by the Soil Conservation Service, United States Department of Agriculture, and the Maine Agricultural Experiment Station.

(Joins sheet 204)



(Joins sheet 213)

(Joins sheet 215)

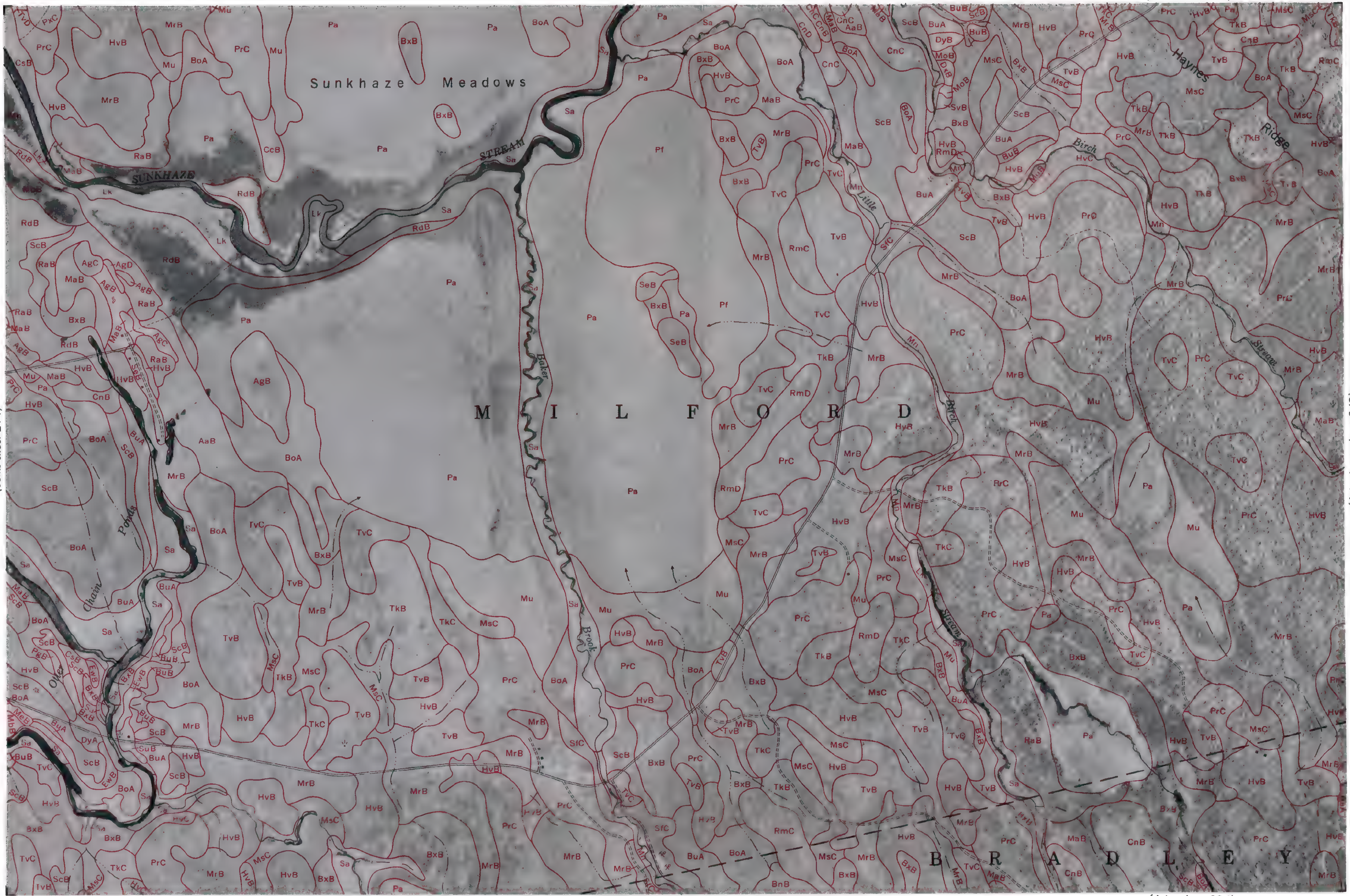
(Joins sheet 223)

0 ½ 1 Mile Scale 1:20 000 0 5000 Feet

215

(Joins sheet 205)

(Joins sheet 214)



(Joins inset, sheet 242)

(Joins sheet 224)

0 ½ 1 Mile Scale 1:20 000 0 5000 Feet

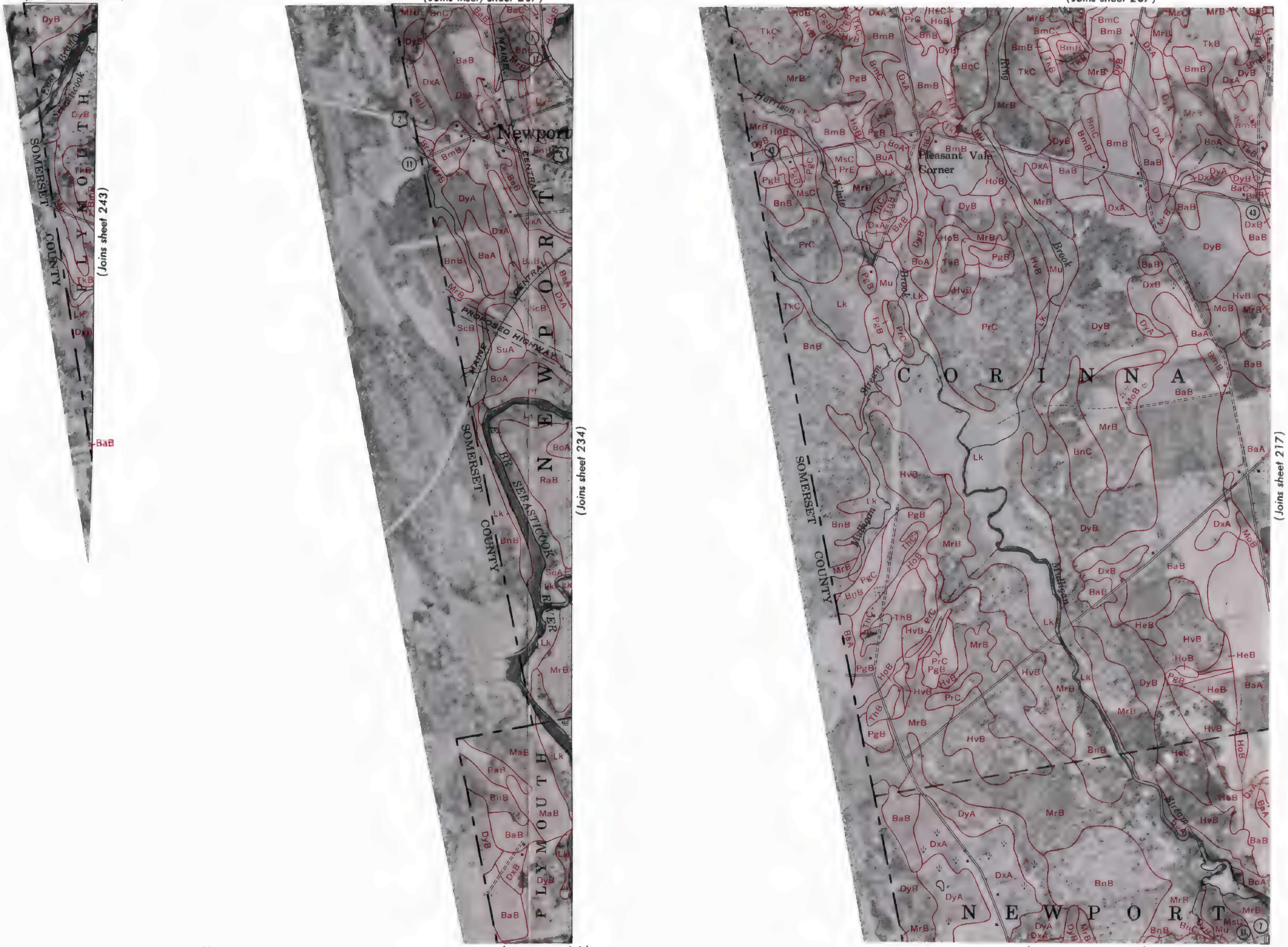
This map is one of a set compiled in 1962, as part of a soil survey by the Soil Conservation Service, United States Department of Agriculture, and the Maine Agricultural Experiment Station.

PENOBSCOT COUNTY, MAINE — SHEET NUMBER 216

(Joins lower center)

(Joins inset, sheet 207)

(Joins sheet 207)



(Joins sheet 243)

(Joins sheet 234)

(Joins sheet 217)

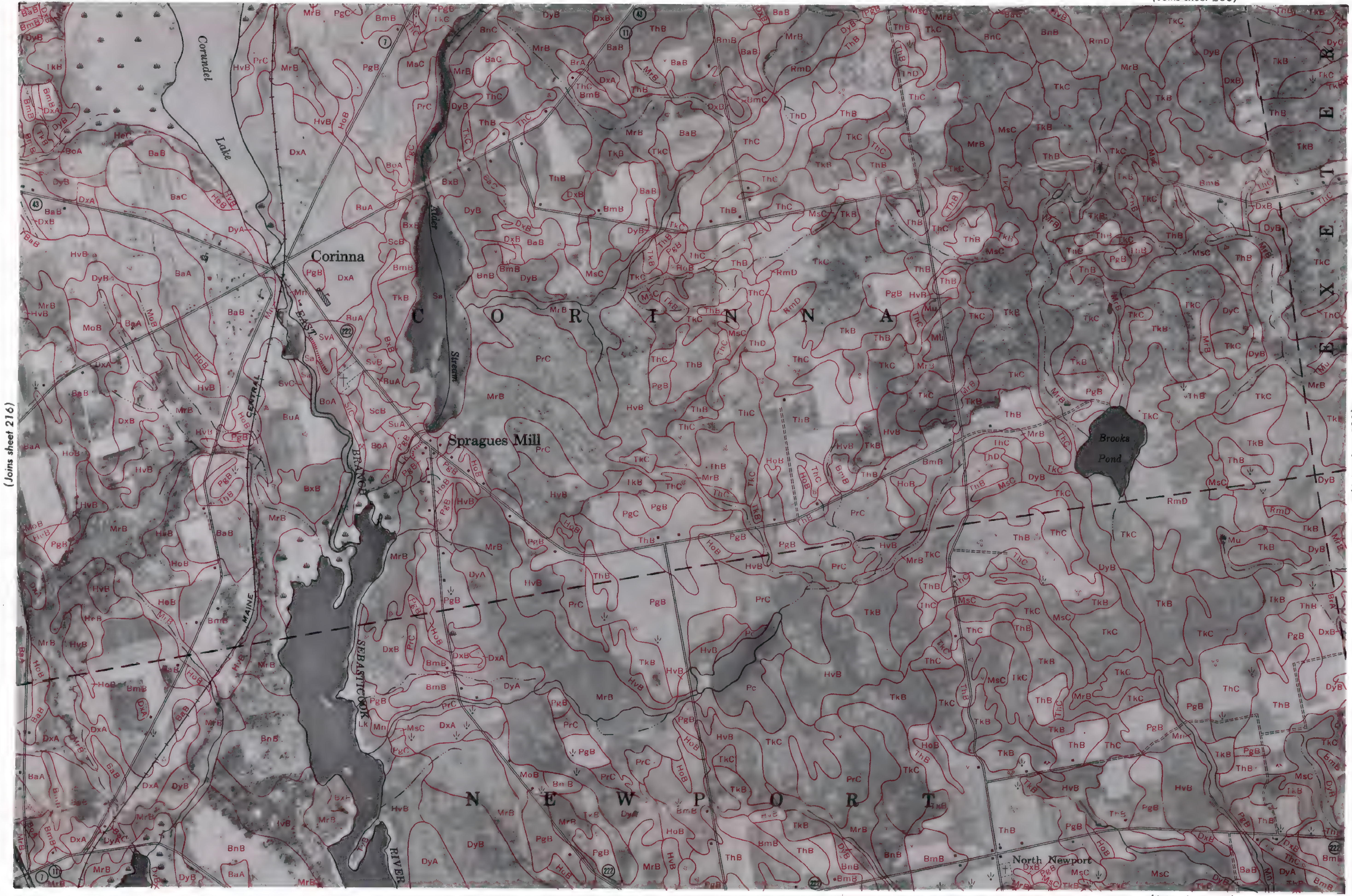
(Joins upper left)

(Joins inset, sheet 207)

0 ½ 1 Mile Scale 1:20 000 0 5000 Feet

(Joins sheet 208)

217



(Joins sheet 216)

(Joins sheet 218)

(Joins sheet 225)

0 ½ 1 Mile Scale 1:20 000 0 5000 Feet

This map is one of a set compiled in 1962, as part of a soil survey by the Soil Conservation Service, United States Department of Agriculture, and the Maine Agricultural Experiment Station.

218

(Joins sheet 209)

(Joins sheet 217)

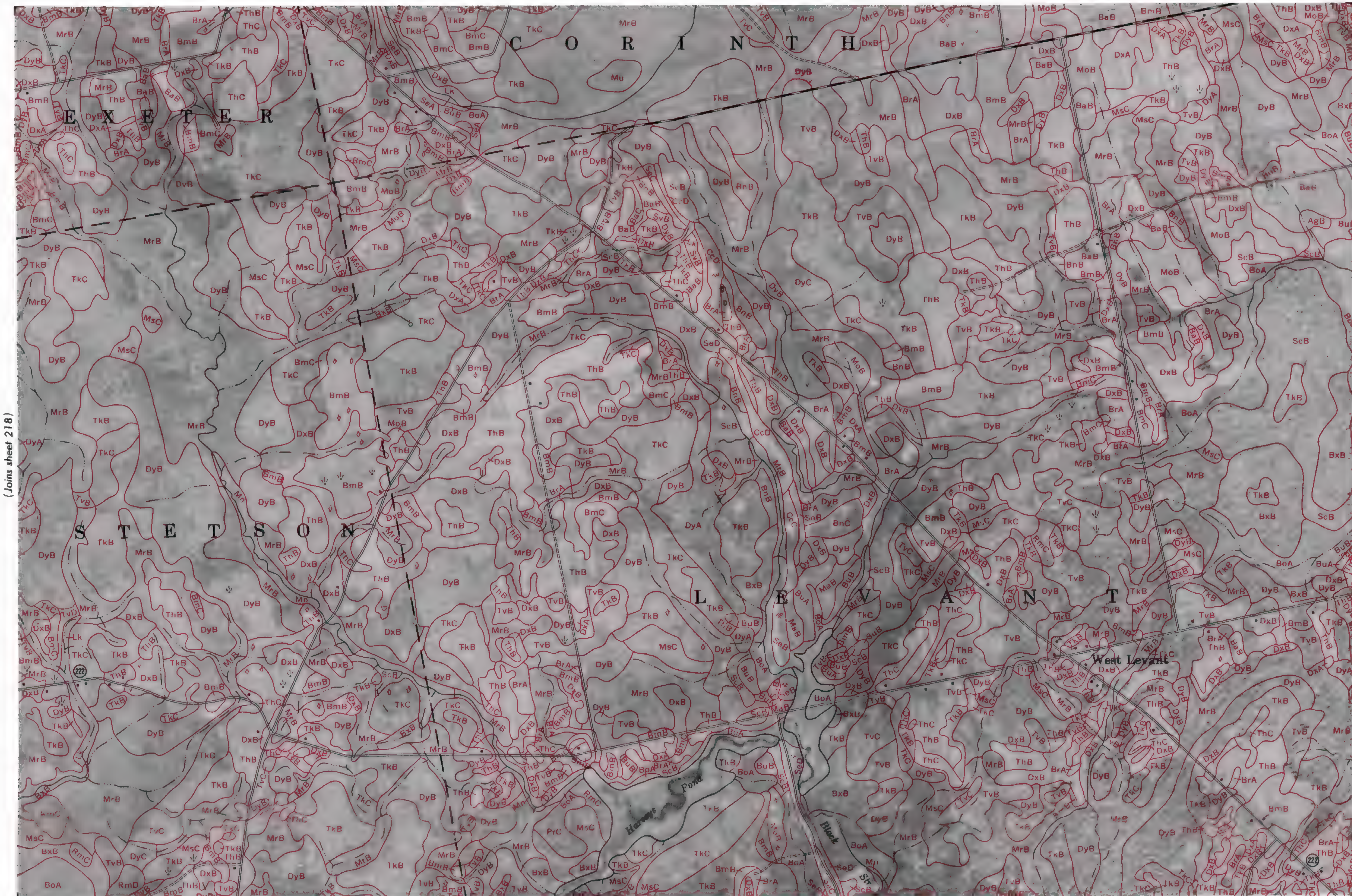
(Joins sheet 219)

(Joins sheet 226)

0 ½ 1 Mile Scale 1:20 000 0 5000 Feet

(Joins sheet 210)

219



N

(Joins sheet 218)

(Joins sheet 220)

(Joins sheet 227)

0 ½ 1 Mile Scale 1:20 000 0 5000 Feet

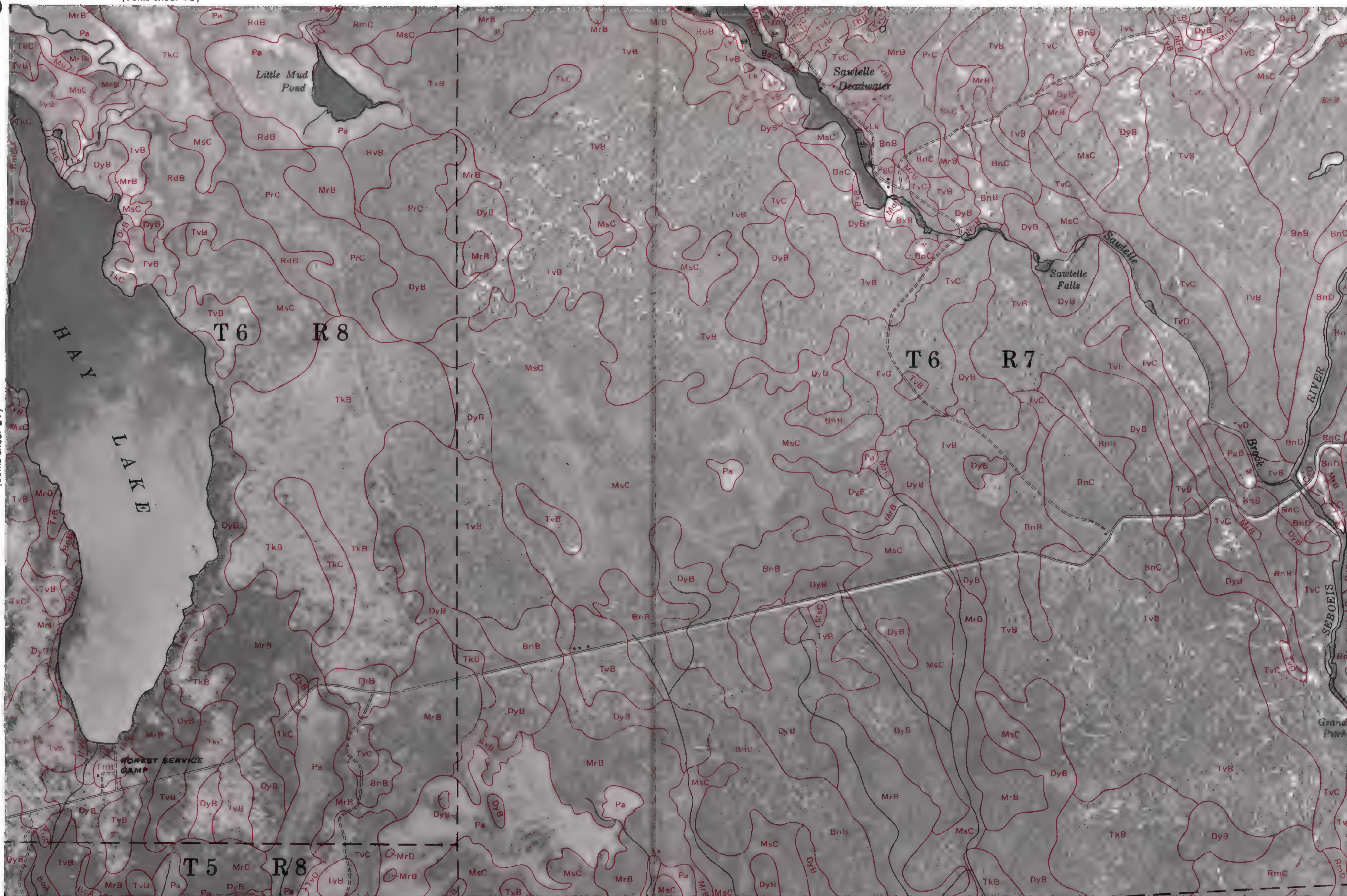
This map is one of a set compiled in 1962, as part of a soil survey by the Soil Conservation Service, United States Department of Agriculture, and the Maine Agricultural Experiment Station.

22

(Joins sheet 18)

N

(Joins sheet 21)



(Joins sheet 23)

(Joins sheet 26)

0 ½ 1 Mile Scale 1:20 000 0 5000 Feet

(220)

(Joins sheet 211)

N

(Joins sheet 219)

(Joins sheet 221)

(Joins sheet 228)

0 ½ 1 Mile Scale 1:20 000 0 5000 Feet

(Joins sheet 212)

221

This map is one of a set compiled in 1962, as part of a soil survey by the Soil Conservation Service, United States Department of Agriculture, and the Maine Agricultural Experiment Station.

(Joins sheet 220)

(Joins sheet 222)

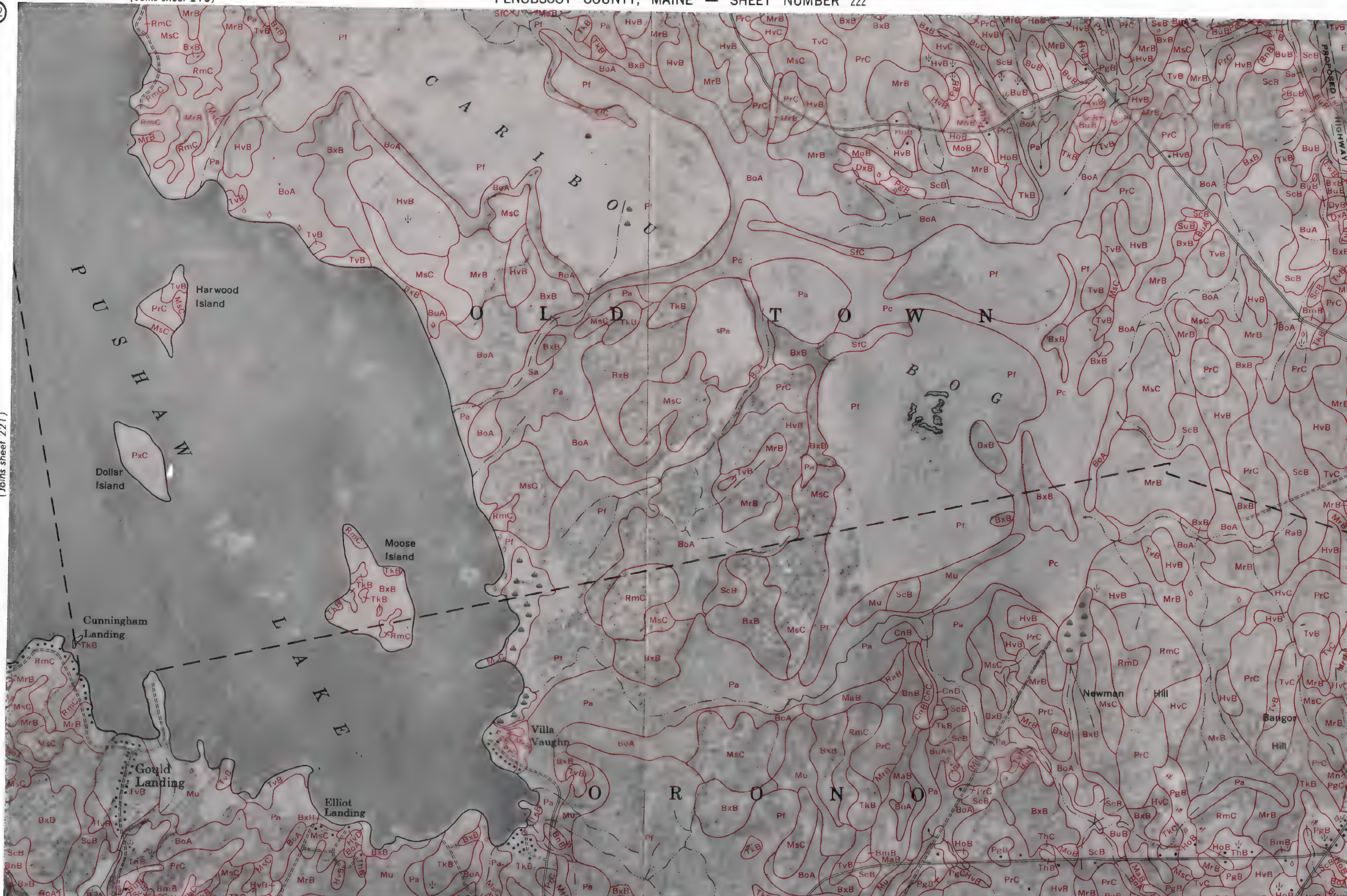
(Joins sheet 229)

0 ½ 1 Mile

Scale 1:20 000

0 5000 Feet

(Joins sheet 213)



(Joins sheet 221)

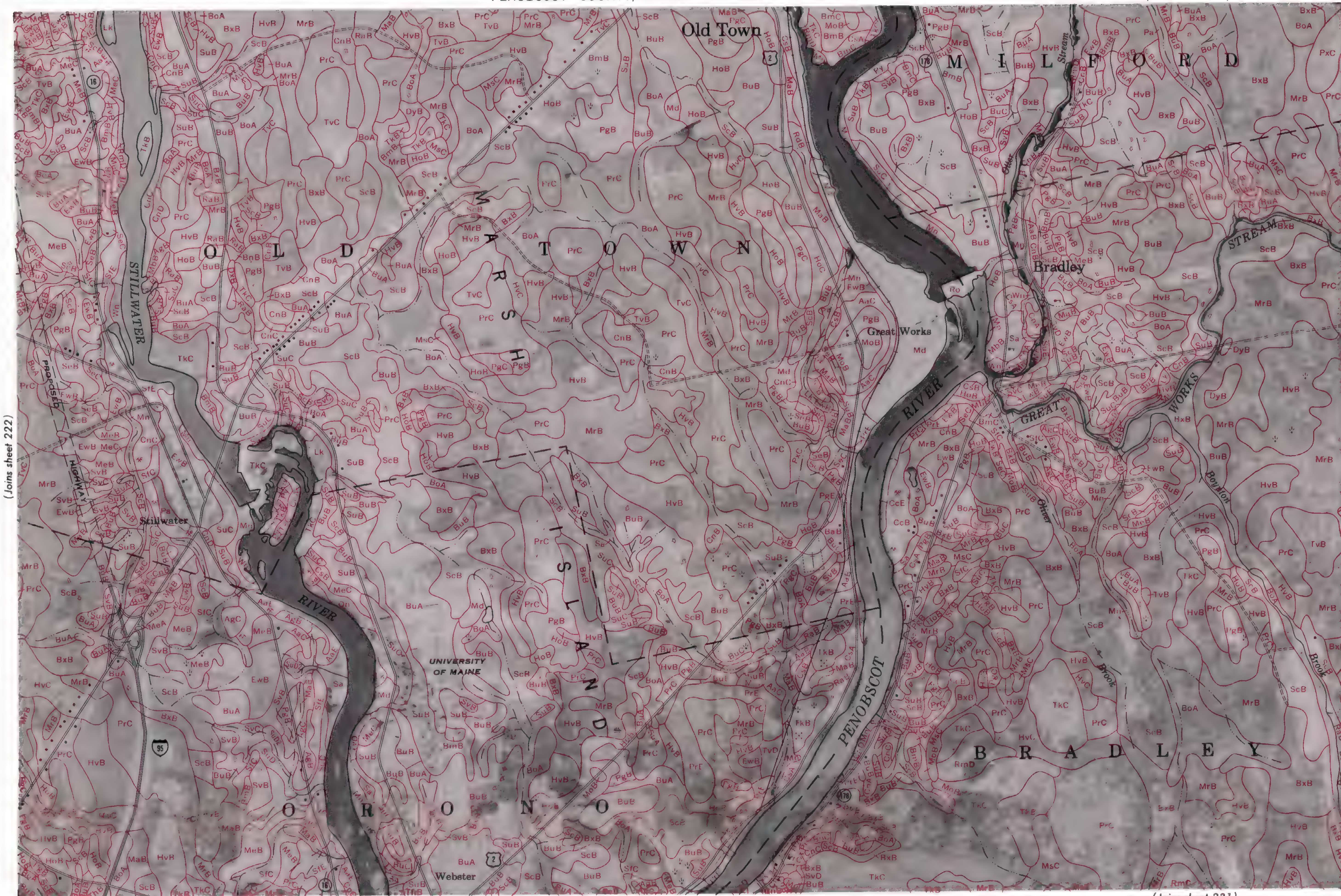
(Joins sheet 223)

(Joins sheet 230)

0 ½ 1 Mile Scale 1:20 000 0 5000 Feet

(Joins sheet 214)

223



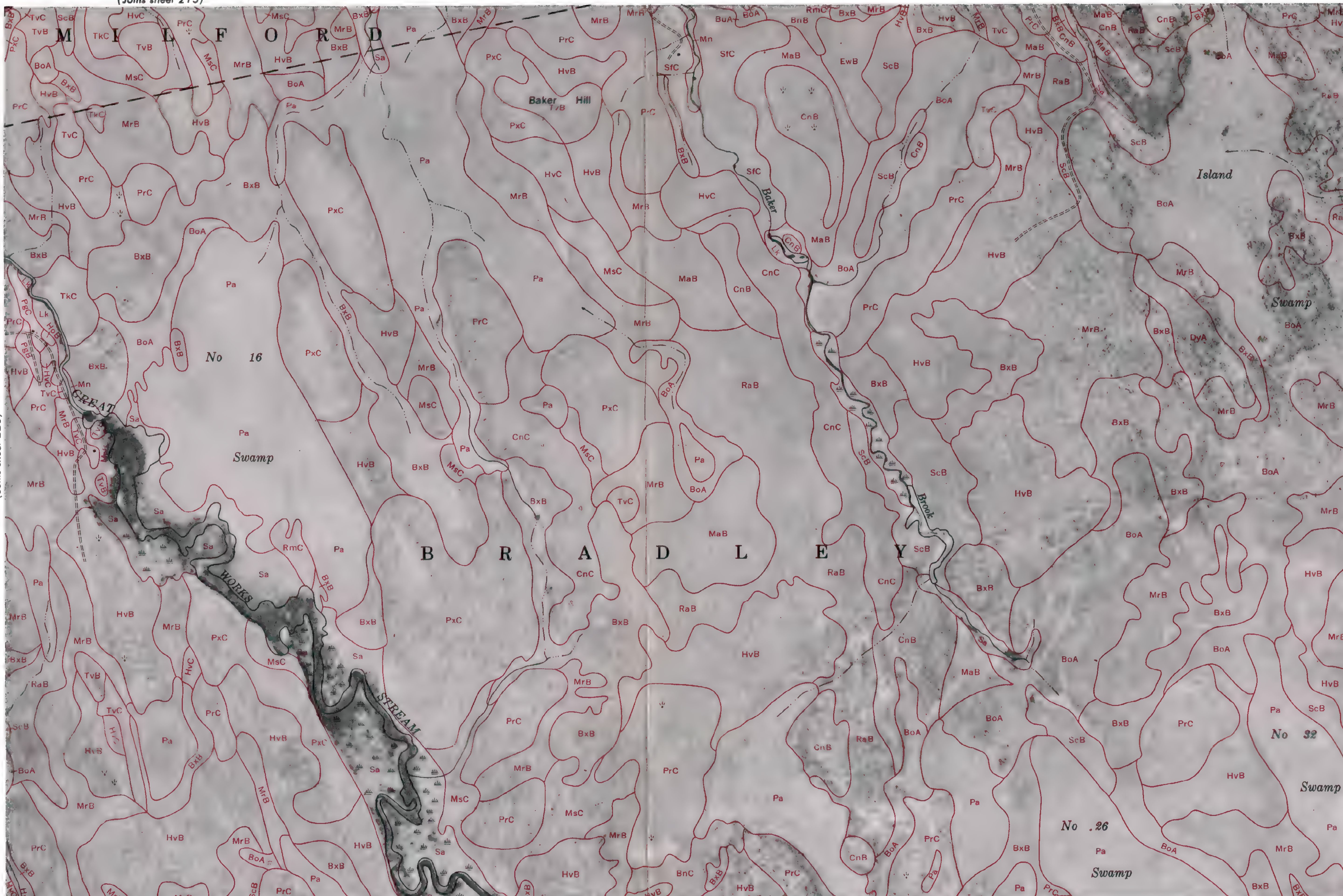
This map is one of a set compiled in 1962, as part of a soil survey by the Soil Conservation Service, United States Department of Agriculture, and the Maine Agricultural Experiment Station.

0 ½ 1 Mile Scale 1:20 000 0 5000 Feet

PENOBSCOT COUNTY, MAINE — SHEET NUMBER 224

(224)

(Joins sheet 215)



(Joins sheet 232)

0 ½ 1 Mile Scale 1:20 000 0 5000 Feet

(Joins sheet 217)

225

(Joins inset, sheet 207)

(Joins sheet 226)

(Joins sheet 234)

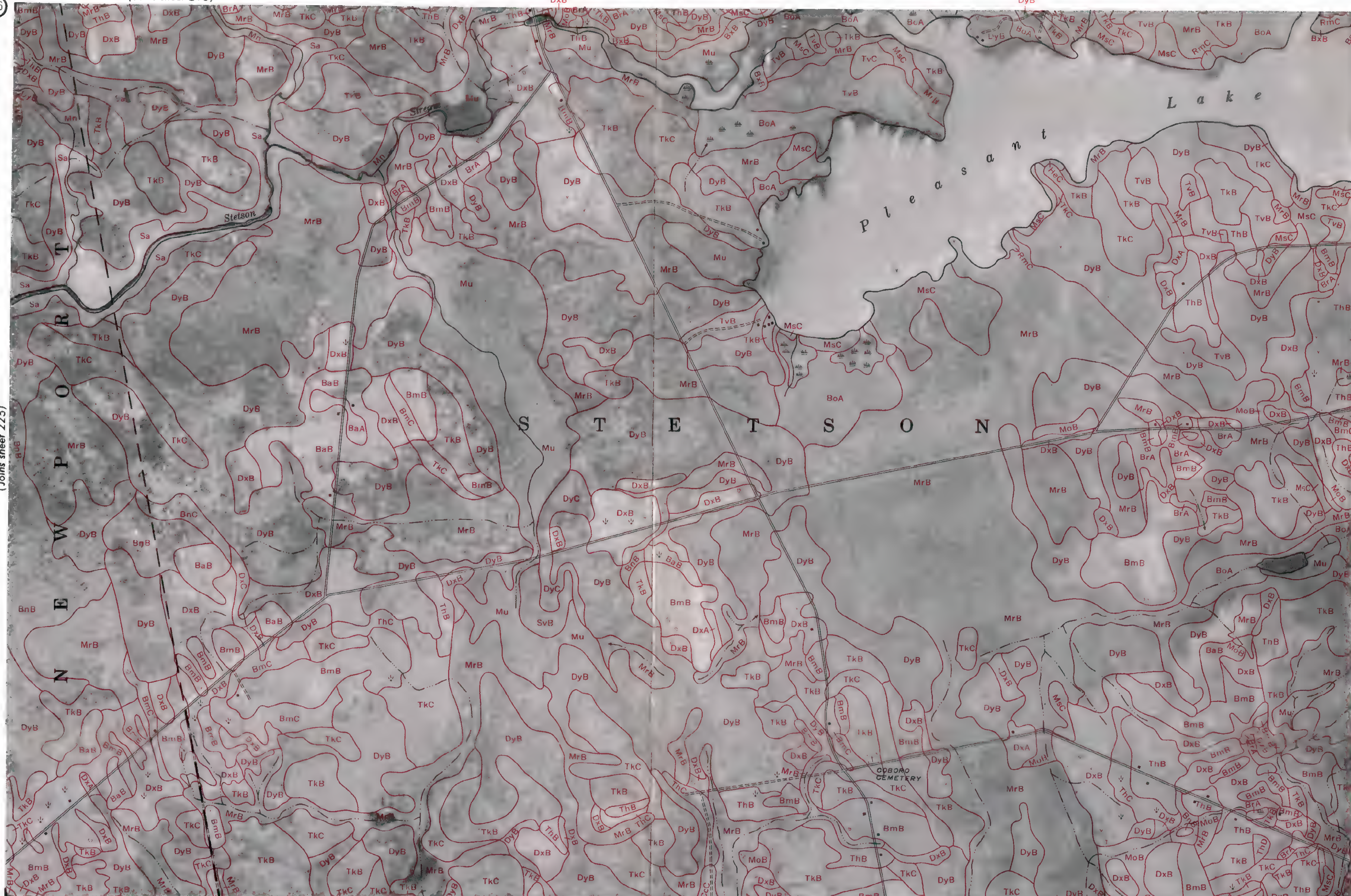
0 ½ 1 Mile Scale 1:20 000 0 5000 Feet

This map is one of a set compiled in 1962, as part of a soil survey by the Soil Conservation Service, United States Department of Agriculture, and the Maine Agricultural Experiment Station.

PENOBSCOT COUNTY, MAINE — SHEET NUMBER 226

(Joins sheet 218)

N



(Joins sheet 225)

(Joins sheet 227)

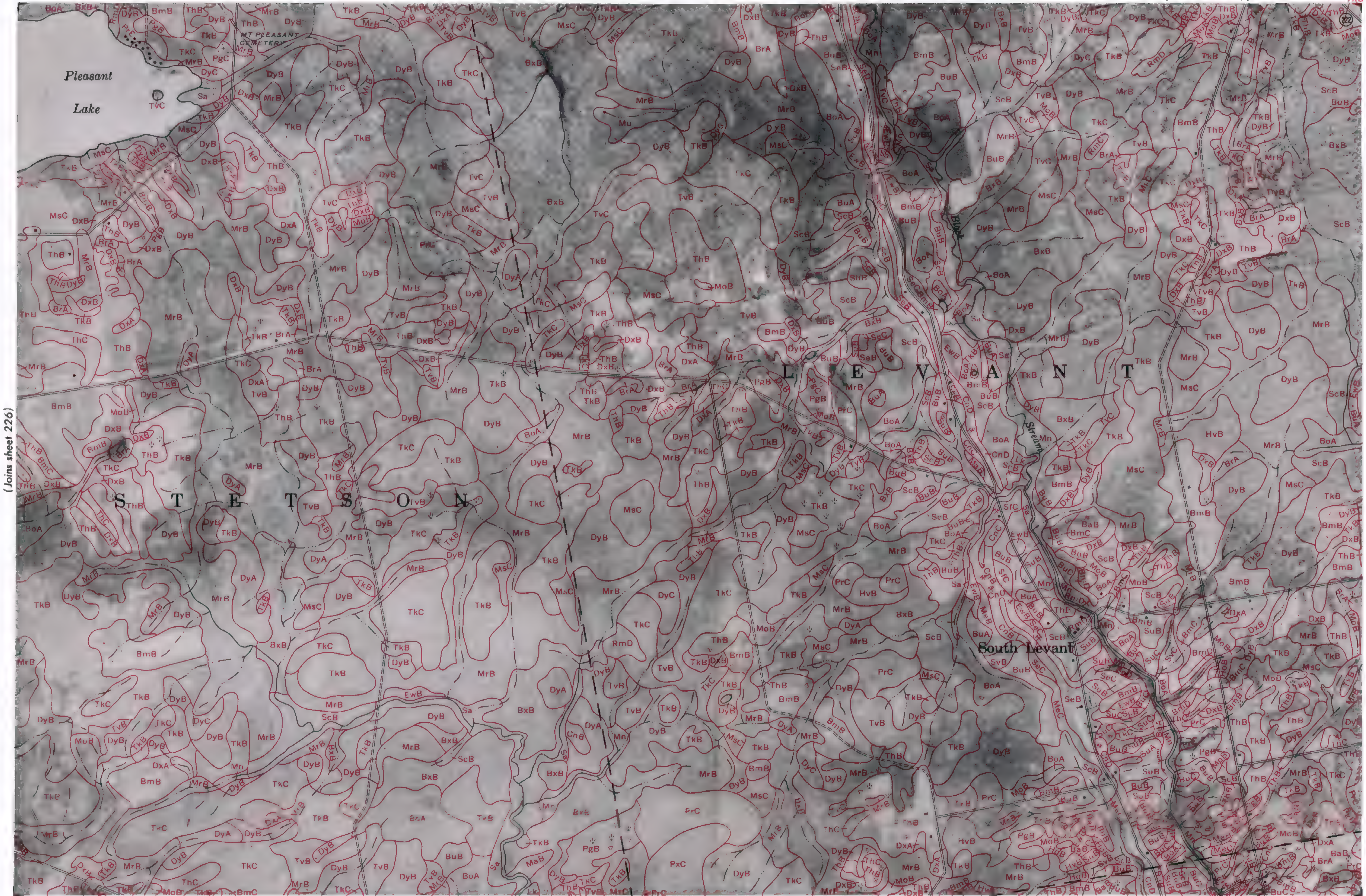
(Joins sheet 235)

0 ½ 1 Mile Scale 1:20 000 0 5000 Feet

(Joins sheet 219)

227

(Joins sheet 226)



(Joins sheet 228)

(Joins sheet 236)

0 ½ 1 Mile
Scale 1:20 000
0 5000 Feet

This map is one of a set compiled in 1962, as part of a soil survey by the Soil Conservation Service, United States Department of Agriculture, and the Maine Agricultural Experiment Station.

228

(Joins sheet 220)

(Joins sheet 227)

(Joins sheet 229)

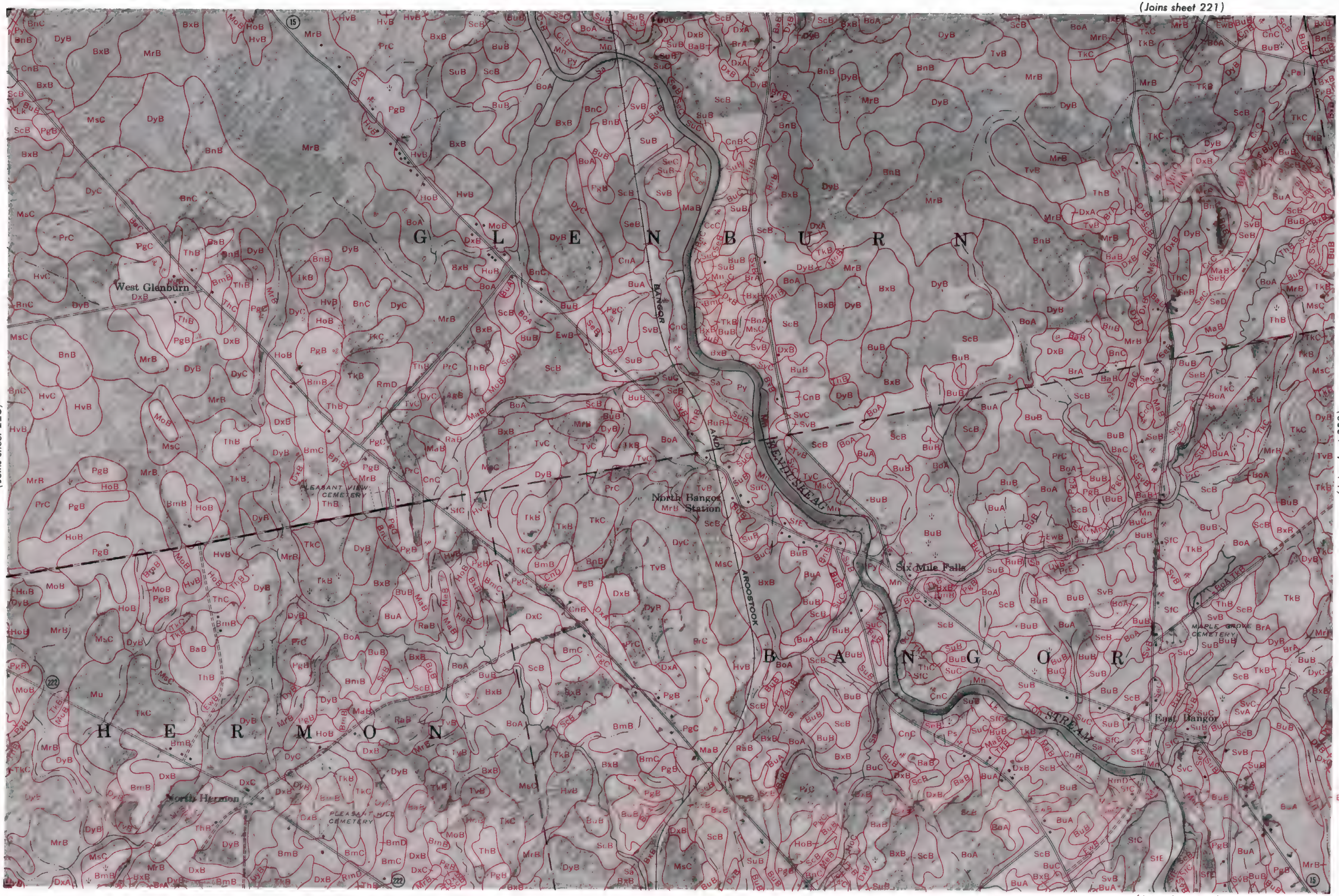
(Joins sheet 237)

0 ½ 1 Mile Scale 1:20 000 0 5000 Feet

(Joins sheet 221)

229

(Joins sheet 228)



(Joins sheet 230)

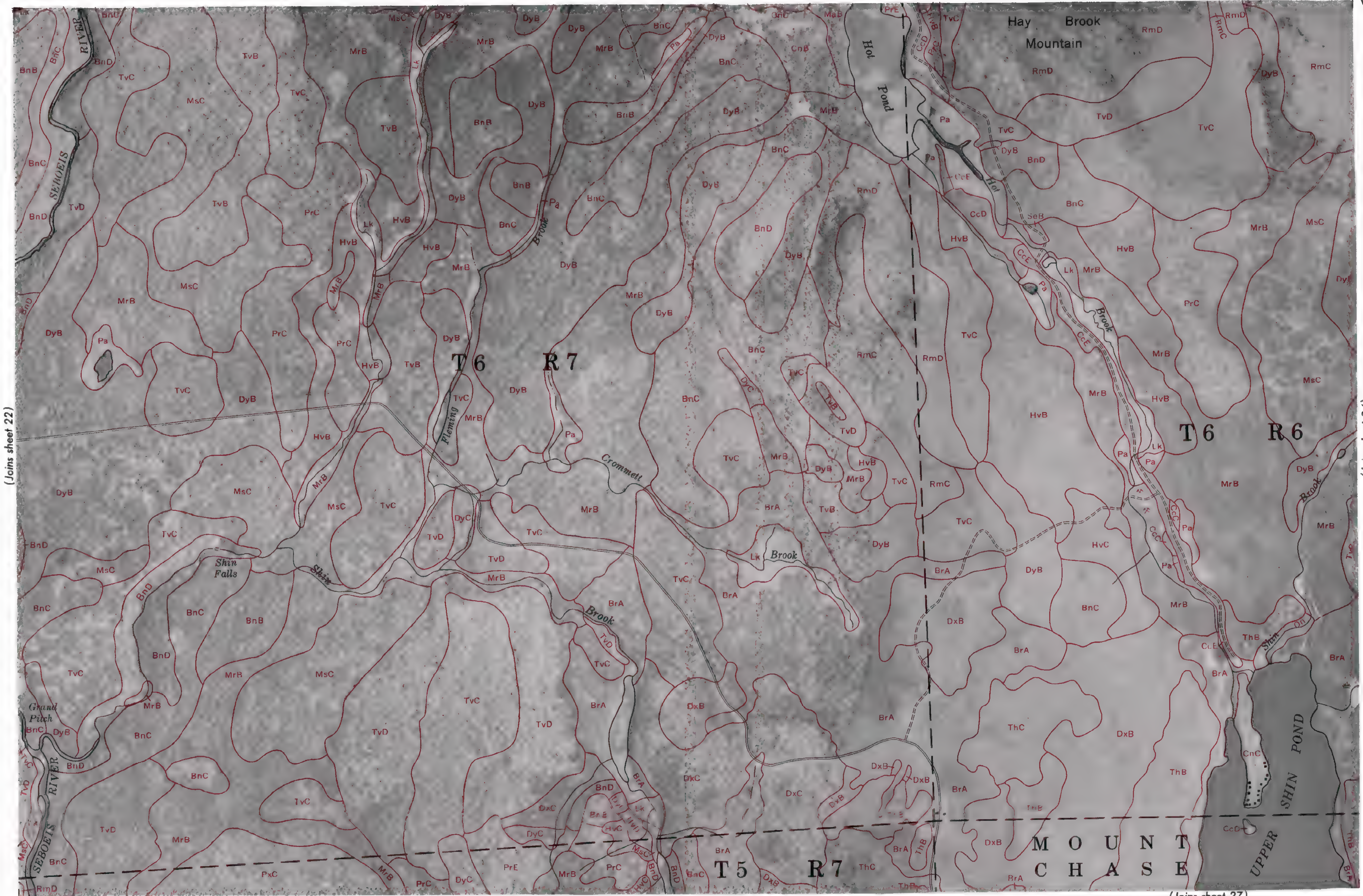
(Joins sheet 238)

0 ½ 1 Mile Scale 1:20 000 0 5000 Feet

This map is one of a set compiled in 1962, as part of a soil survey by the Soil Conservation Service, United States Department of Agriculture, and the Maine Agricultural Experiment Station.

(Joins sheet 19)

(Joins sheet 22)

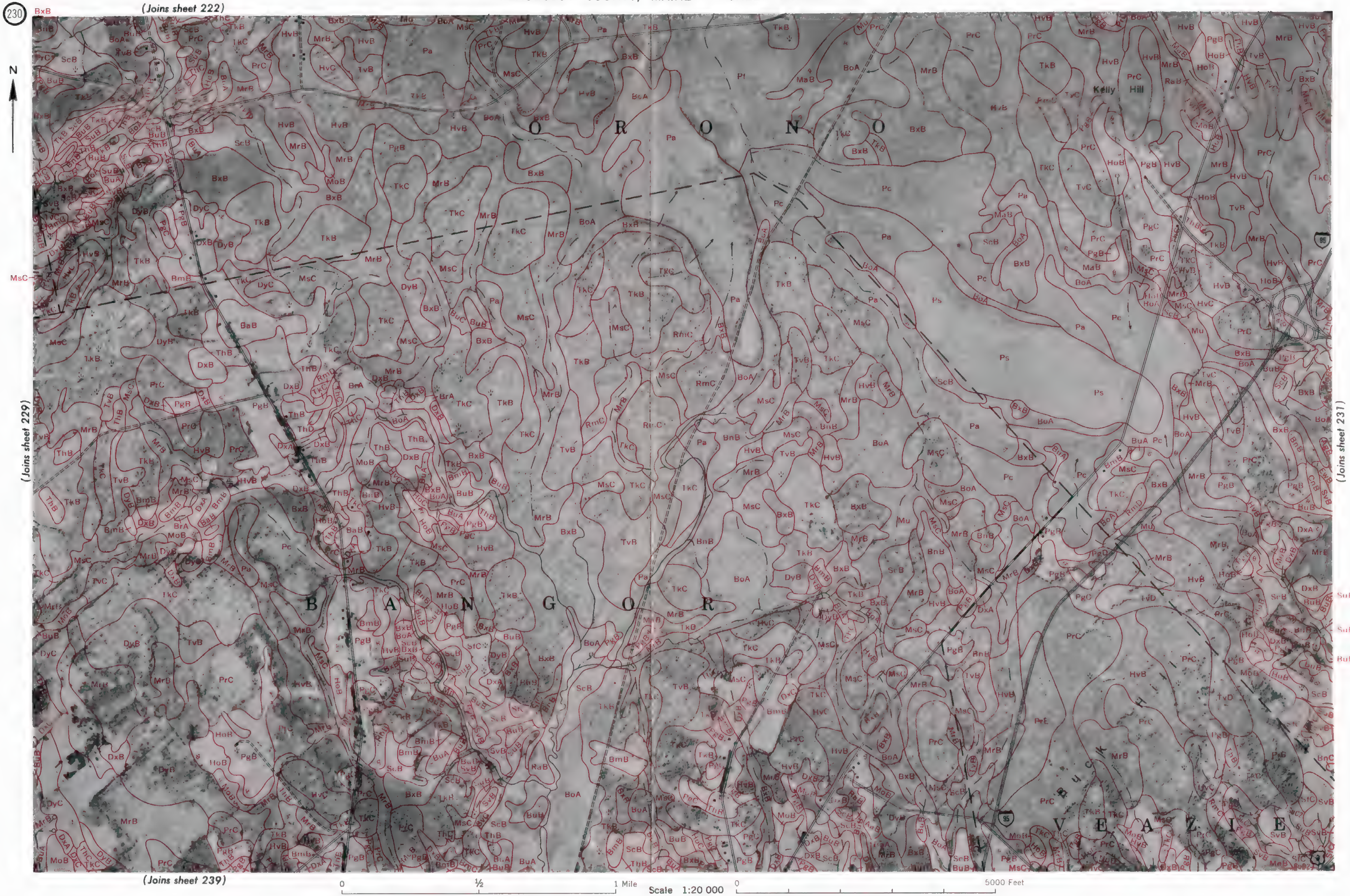


(Joins sheet 24)

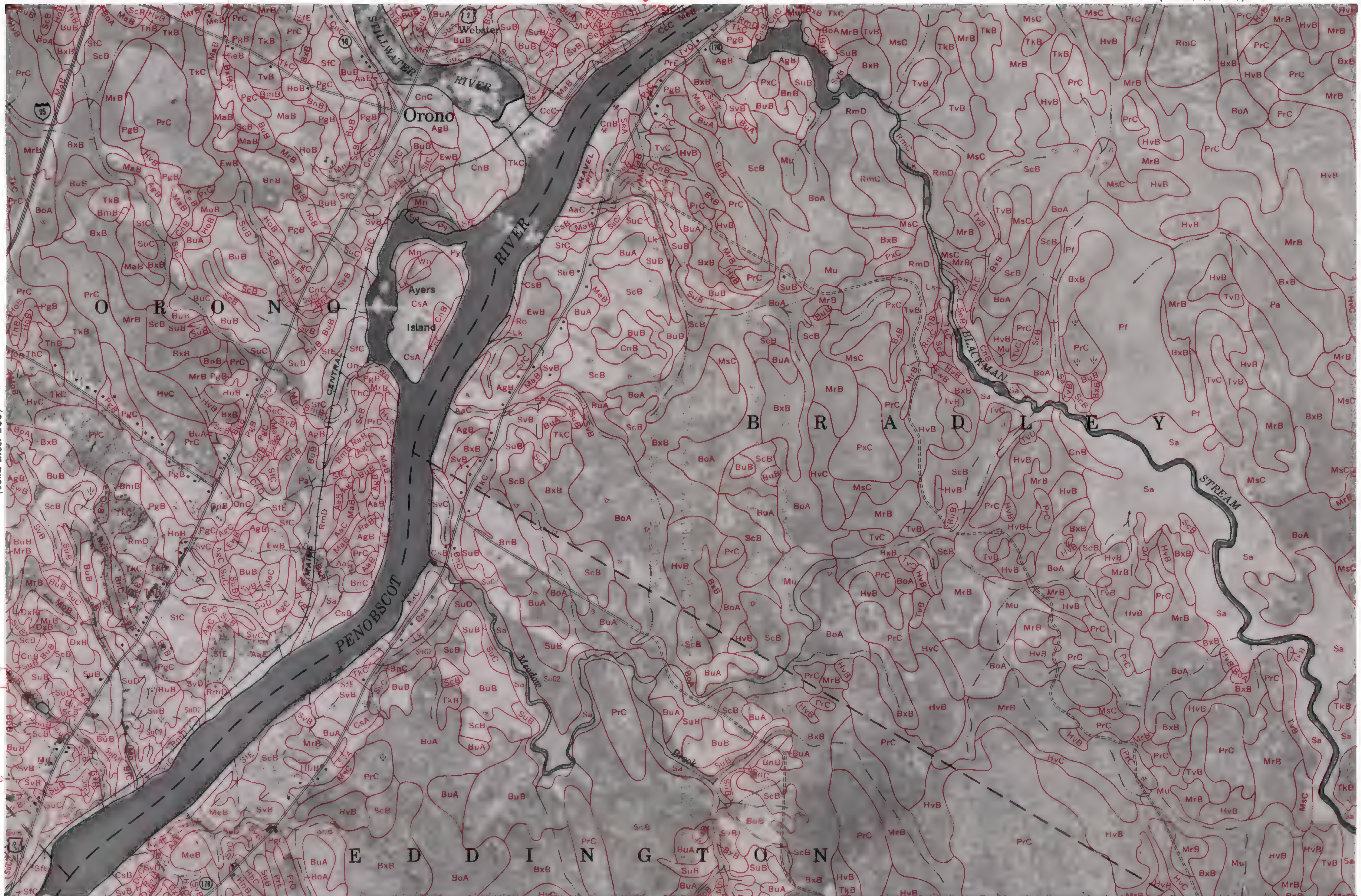
(Joins sheet 27)

0 ½ 1 Mile Scale 1:20 000 0 5000 Feet

This map is one of a set compiled in 1962, as part of a soil survey by the Soil Conservation Service, United States Department of Agriculture, and the Maine Agricultural Experiment Station.


230
(Joins sheet 222)
(Joins sheet 229)
(Joins sheet 231)
(Joins sheet 239)
N
O R O N O
B A N G O R
V E A Z I E
Kelly Hill
Buck Hill
0
½
1 Mile
Scale 1:20 000
0
5000 Feet

(Joins sheet 223)



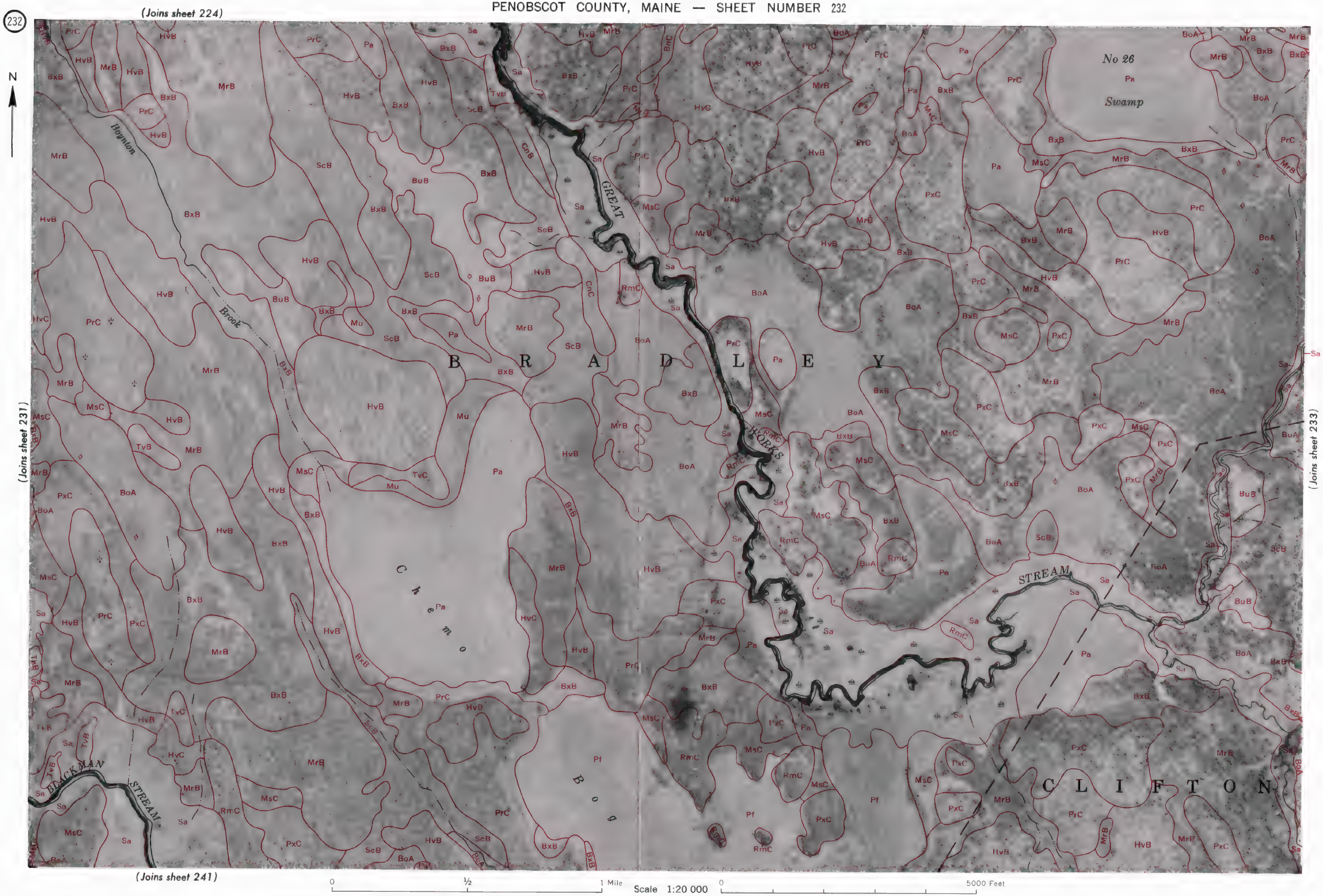
(Joins sheet 230)

(Joins sheet 232)

(Joins sheet 240)

0 ½ 1 Mile Scale 1:20 000 0 5000 Feet

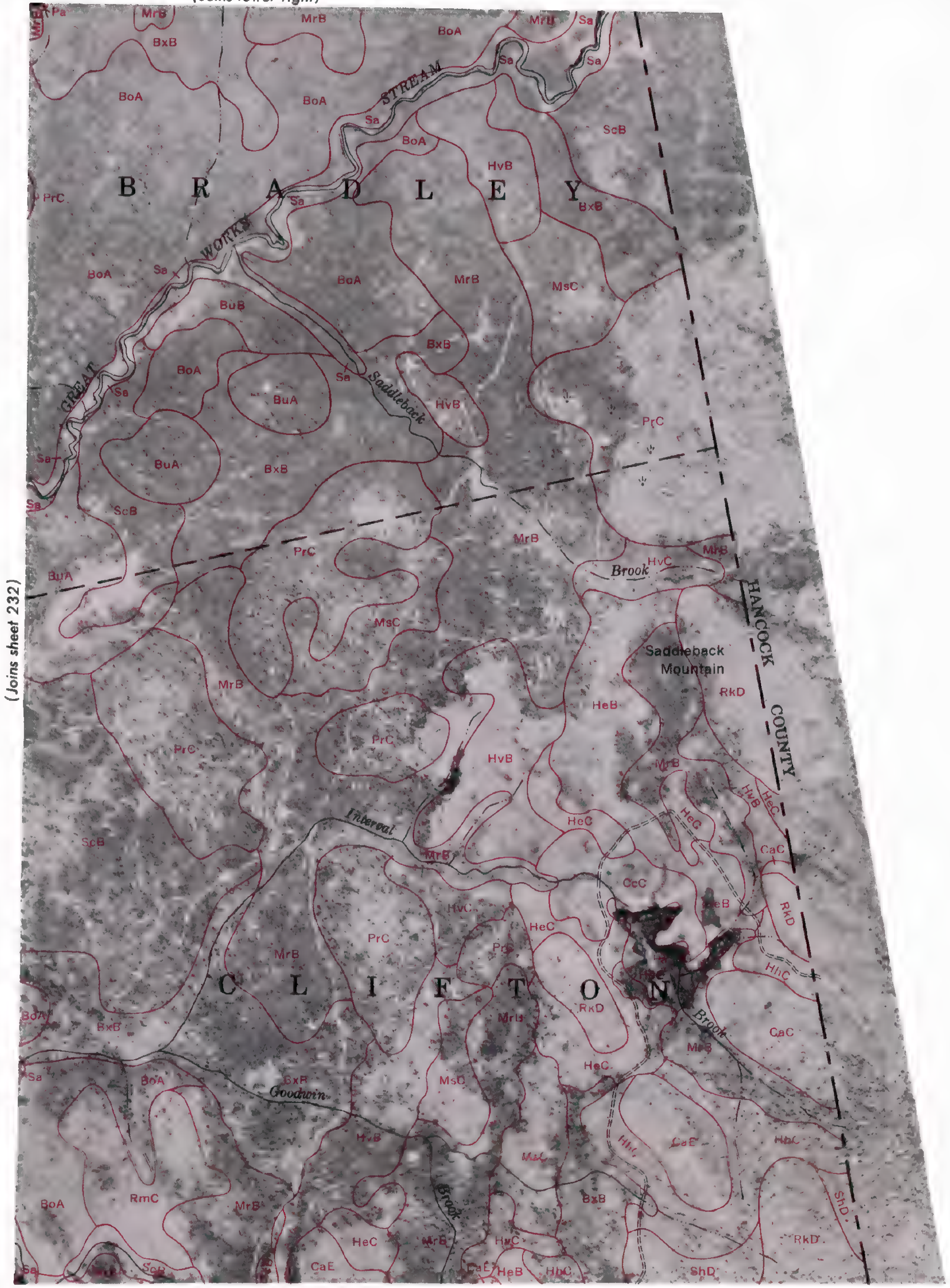
This map is one of a set compiled in 1962, as part of a soil survey by the Soil Conservation Service, United States Department of Agriculture, and the Maine Agricultural Experiment Station.


232
(Joins sheet 224)
(Joins sheet 231)
(Joins sheet 233)
(Joins sheet 241)
N
No 26
Pa
Swamp
B R A D L E Y
C L I F T O N
GREAT WORKS
STREAM
Boynton Brook
Chemo
Chemo Bog
BLACKMAN STREAM
0
½
1 Mile
Scale 1:20 000
0
5000 Feet

N

(Joins lower right)

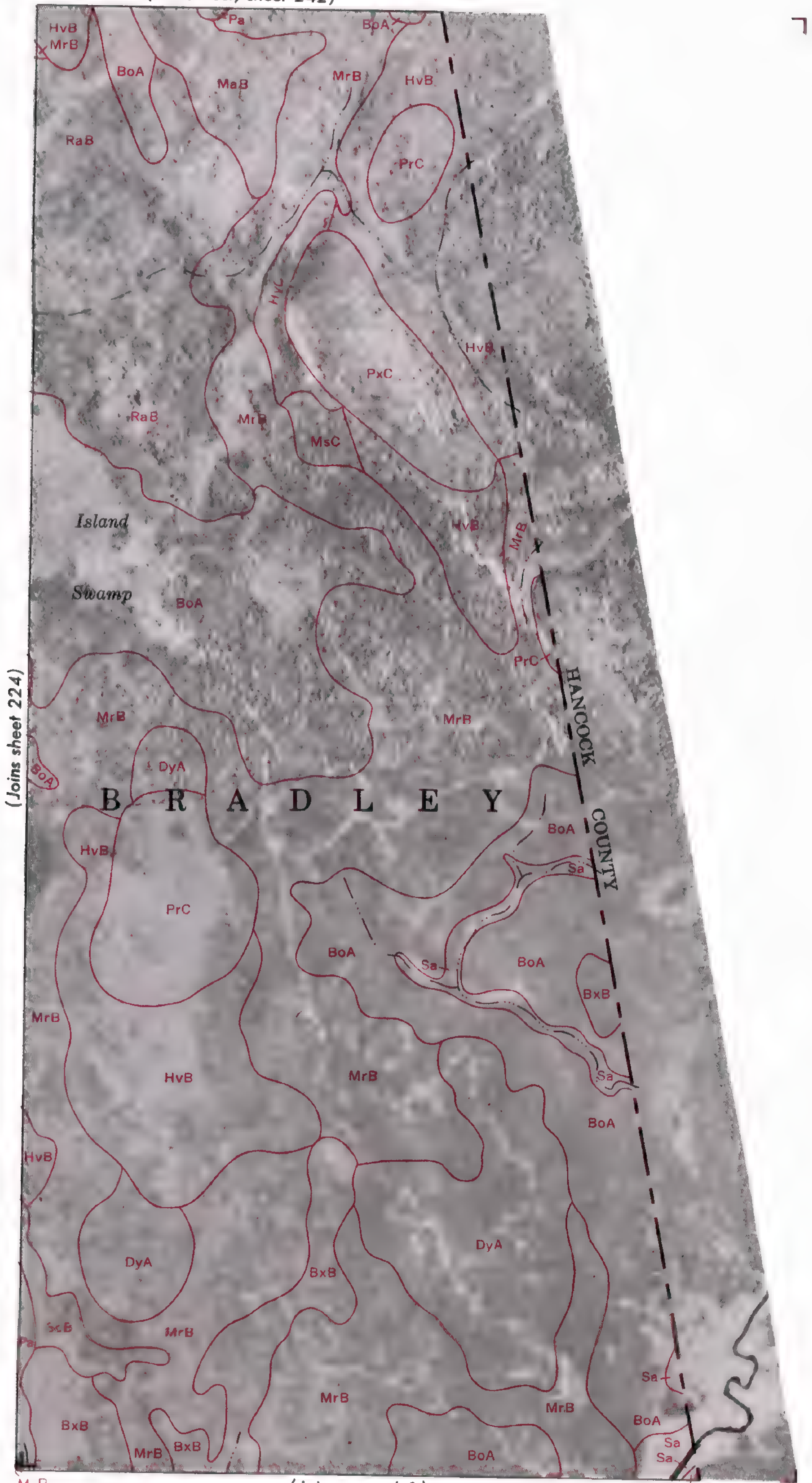
(Joins sheet 232)



(Joins sheet 242)

(Joins inset, sheet 242)

(Joins sheet 224)



(Joins upper left)

0 ½ 1 Mile

Scale 1:20 000

0 5000 Feet

234

(Joins sheet 225)

(Joins inset, sheet 216)

(Joins sheet 235)

(Joins sheet 243)

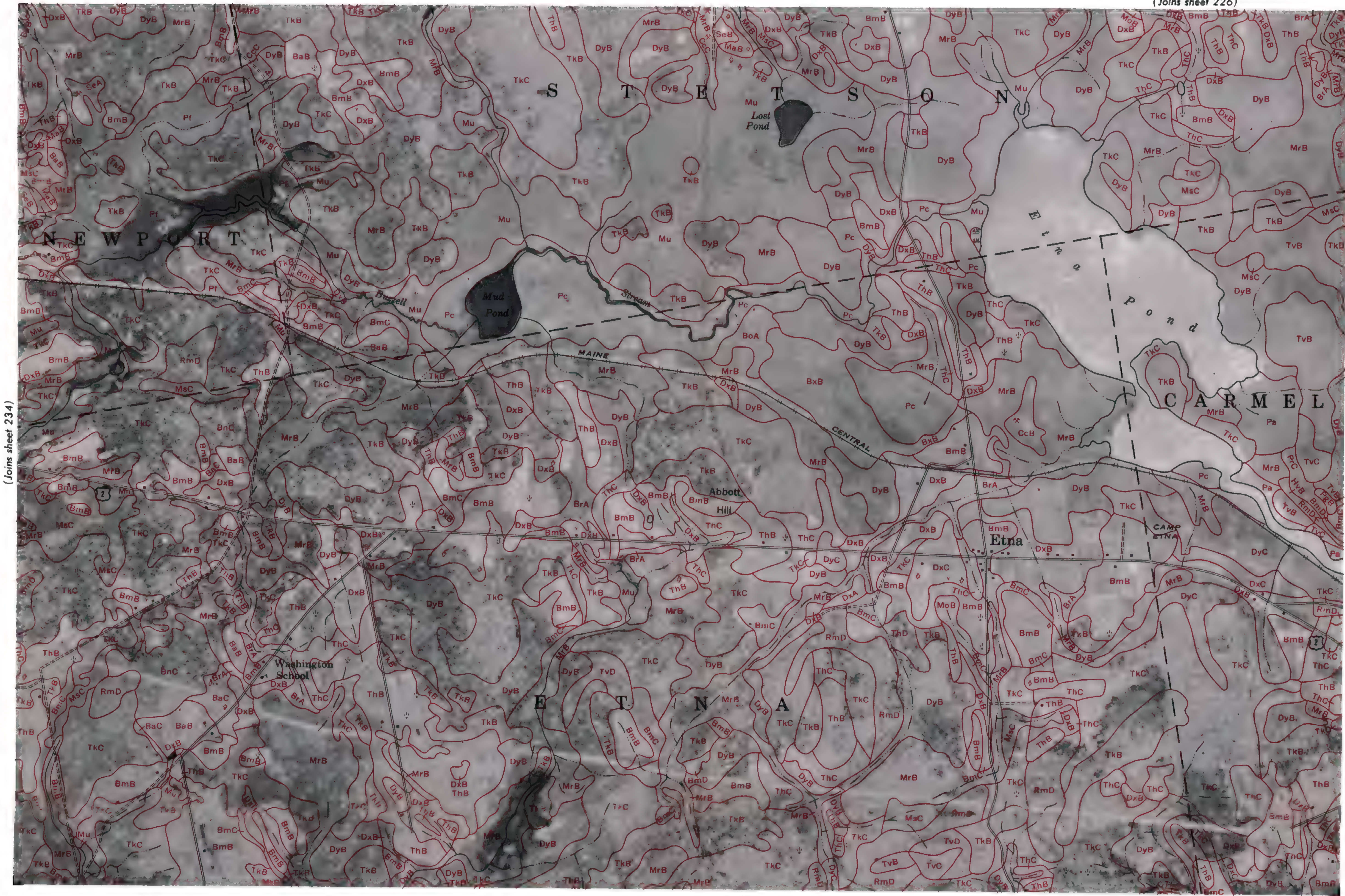
Scale 1:20 000

0 ½ 1 Mile

0 5000 Feet

(Joins sheet 226)

235



(Joins sheet 234)

(Joins sheet 236)

(Joins sheet 244)

0 ½ 1 Mile Scale 1:20 000 0 5000 Feet

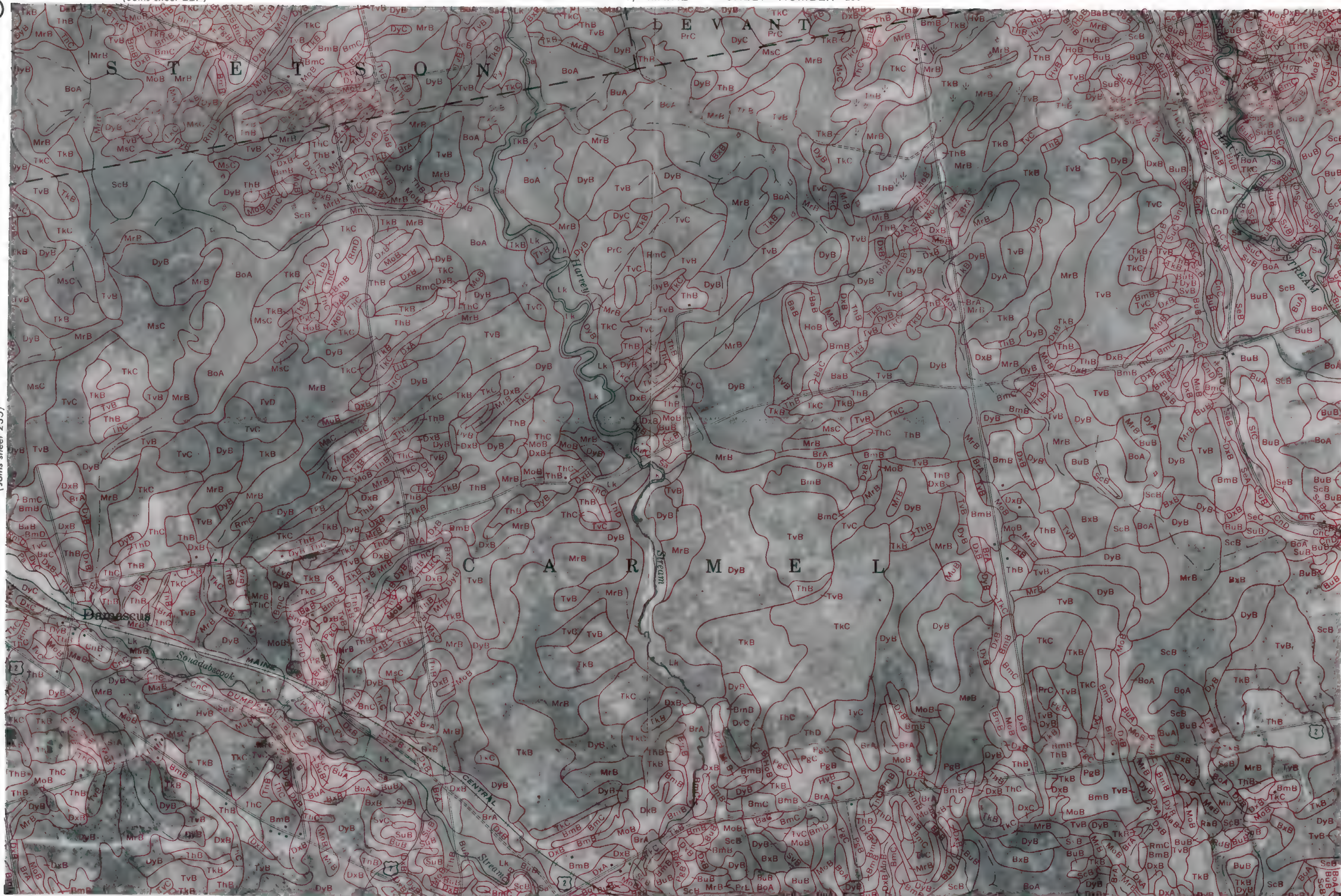
This map is one of a set compiled in 1962, as part of a soil survey by the Soil Conservation Service, United States Department of Agriculture, and the Maine Agricultural Experiment Station.

236

(Joins sheet 227)

(Joins sheet 235)

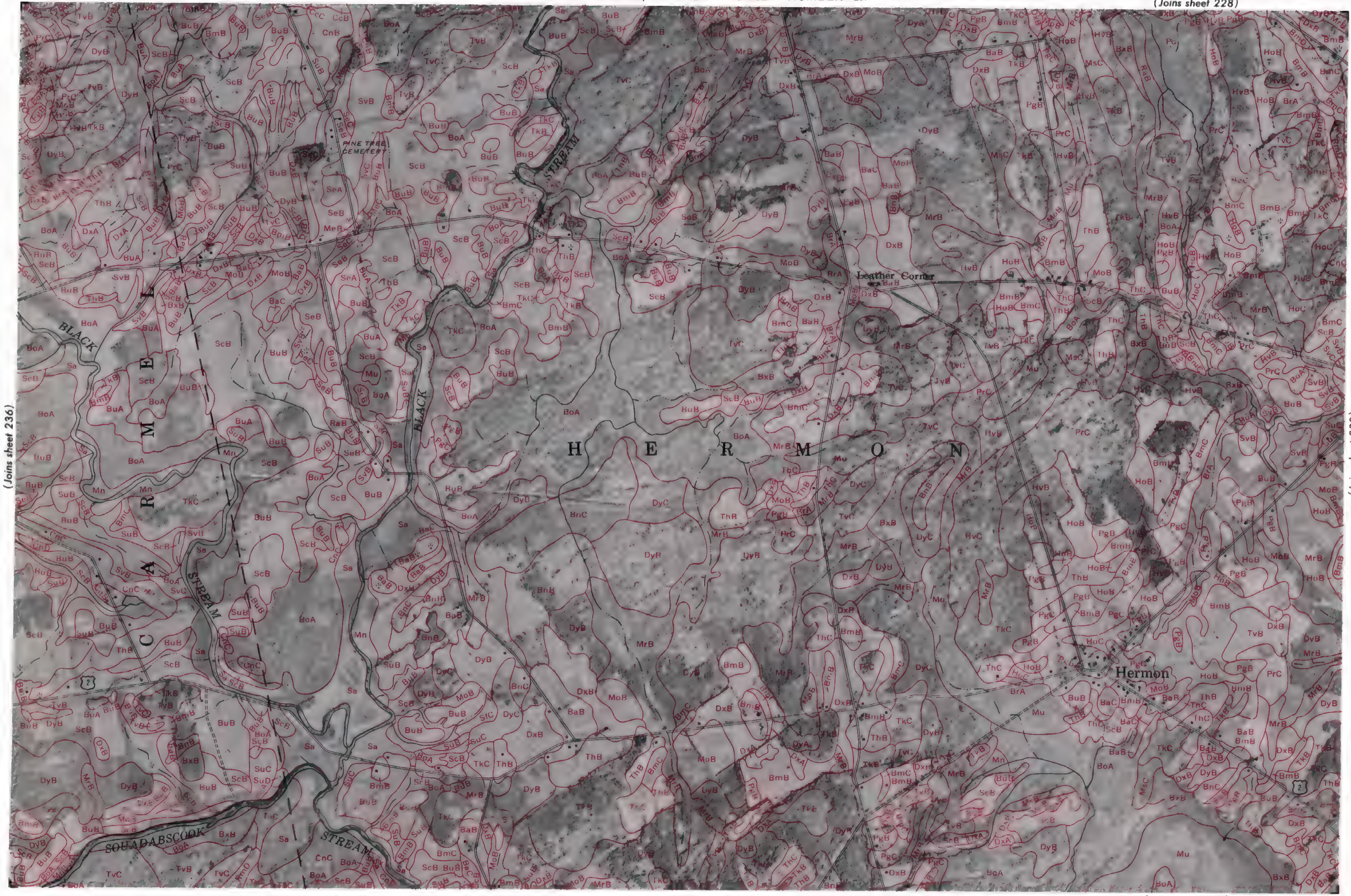
(Joins sheet 237)



(Joins sheet 245)

0 ½ 1 Mile Scale 1:20 000 0 5000 Feet

(Joins sheet 228)



(Joins sheet 236)

(Joins sheet 238)

(Joins sheet 246)

0 ½ 1 Mile Scale 1:20 000 0 5000 Feet

This map is one of a set compiled in 1962, as part of a soil survey by the Soil Conservation Service, United States Department of Agriculture, and the Maine Agricultural Experiment Station.

(Joins sheet 229)

(Joins sheet 237)

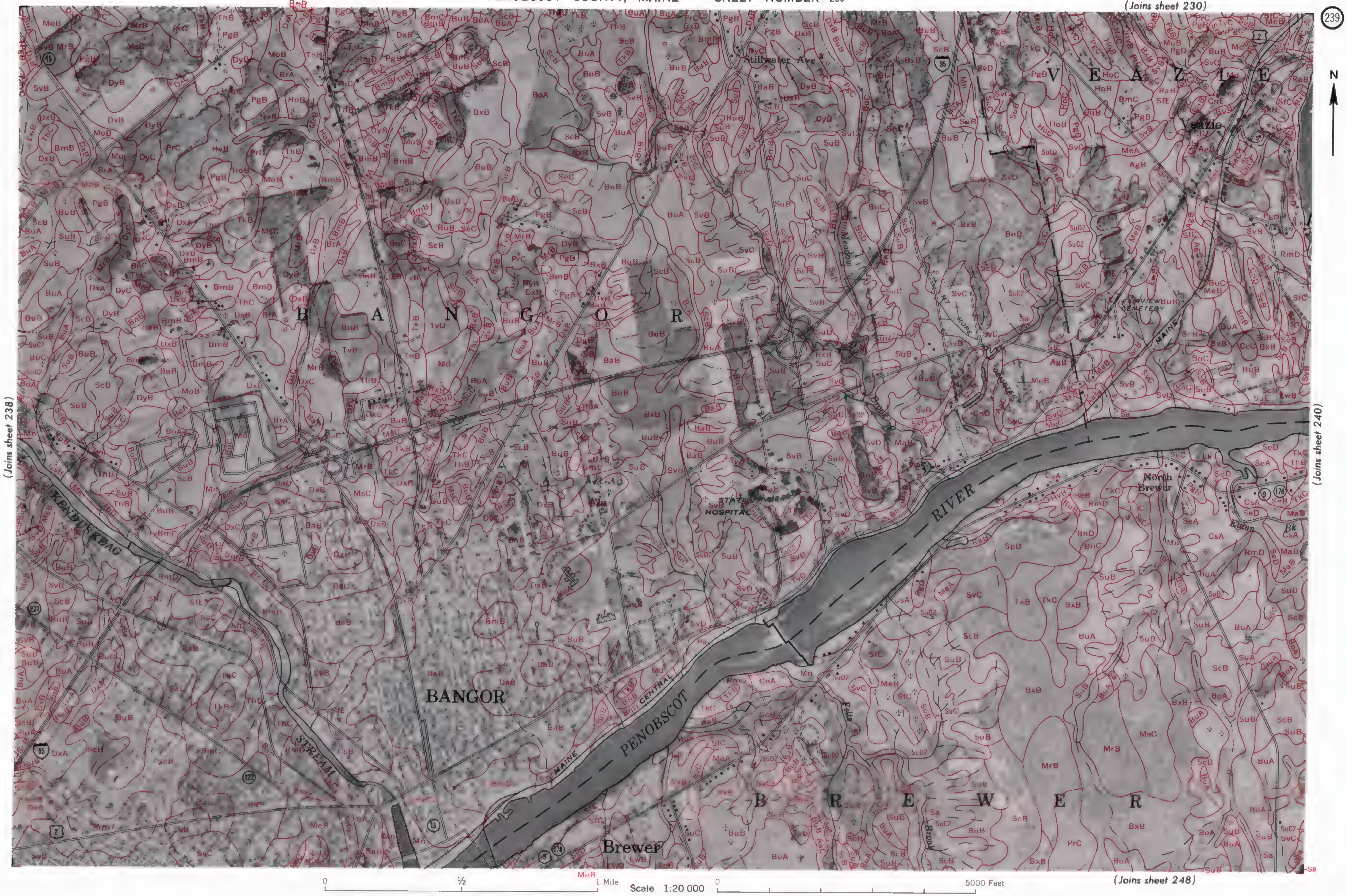
(Joins sheet 239)

(Joins sheet 247)

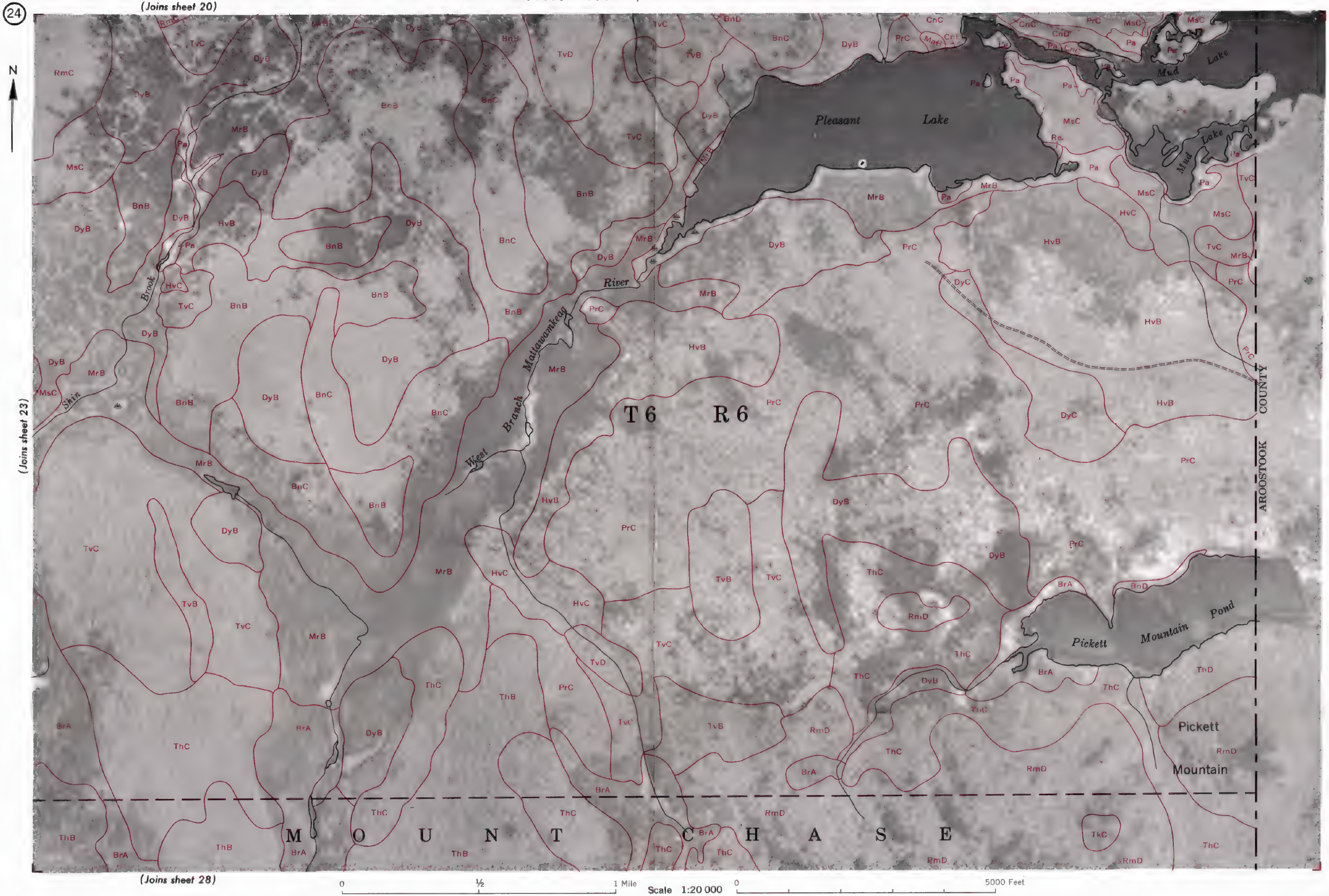
0 ½ 1 Mile

Scale 1:20 000

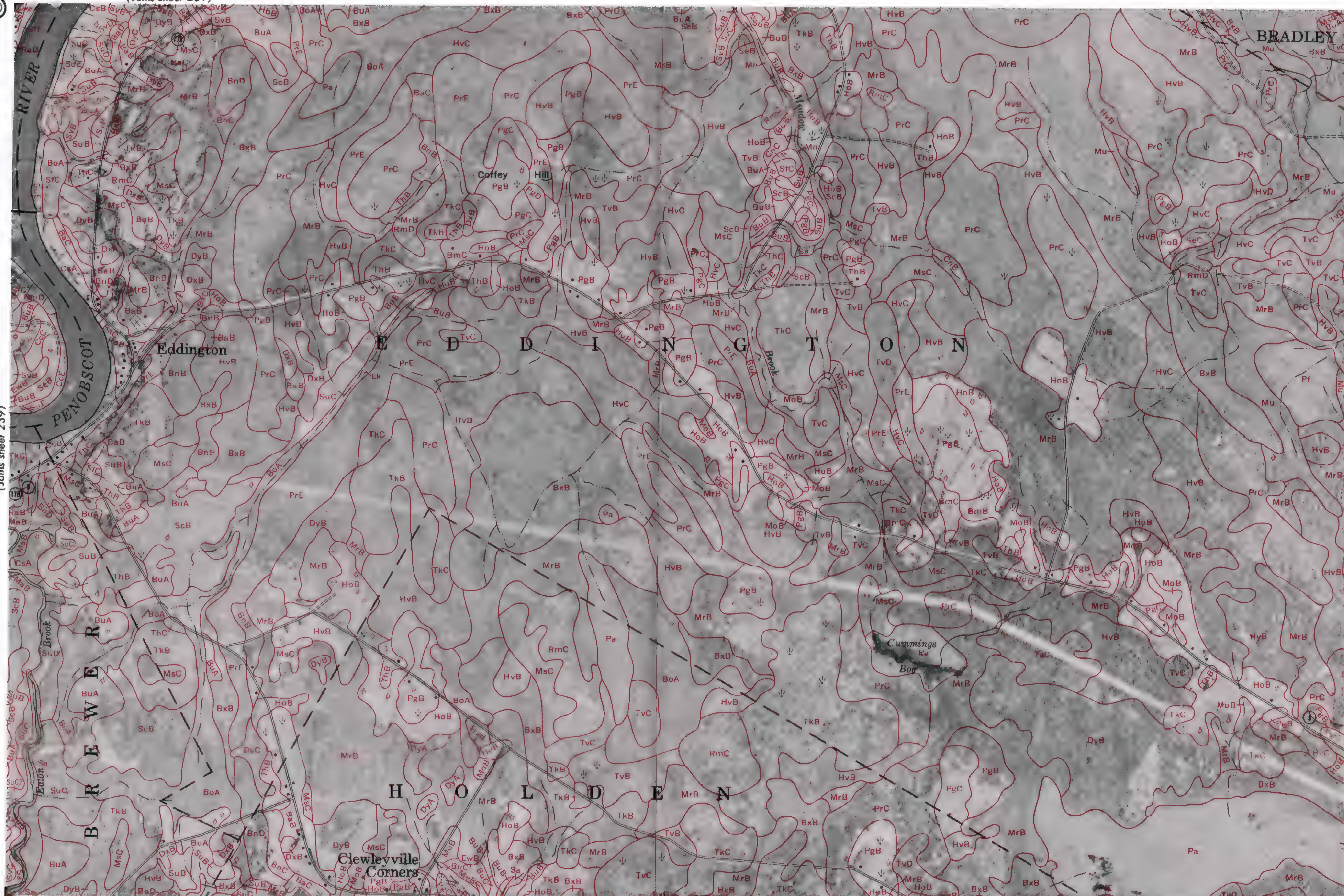
0 5000 Feet



This map is one of a set compiled in 1962, as part of a soil survey by the Soil Conservation Service, United States Department of Agriculture, and the Maine Agricultural Experiment Station.


24
(Joins sheet 20)
(Joins sheet 23)
(Joins sheet 28)
N
Pleasant Lake
Mud Lake
Mud Lake
River
West Branch Mattawamkeag
Shin Brook
T6 R6
AROOSTOOK COUNTY
Pickett Mountain Pond
Pickett Mountain
MOUNT CHASE
0
½
1 Mile
Scale 1:20 000
0
5000 Feet

(Joins sheet 231)



(Joins sheet 249)

Scale 1:20 000

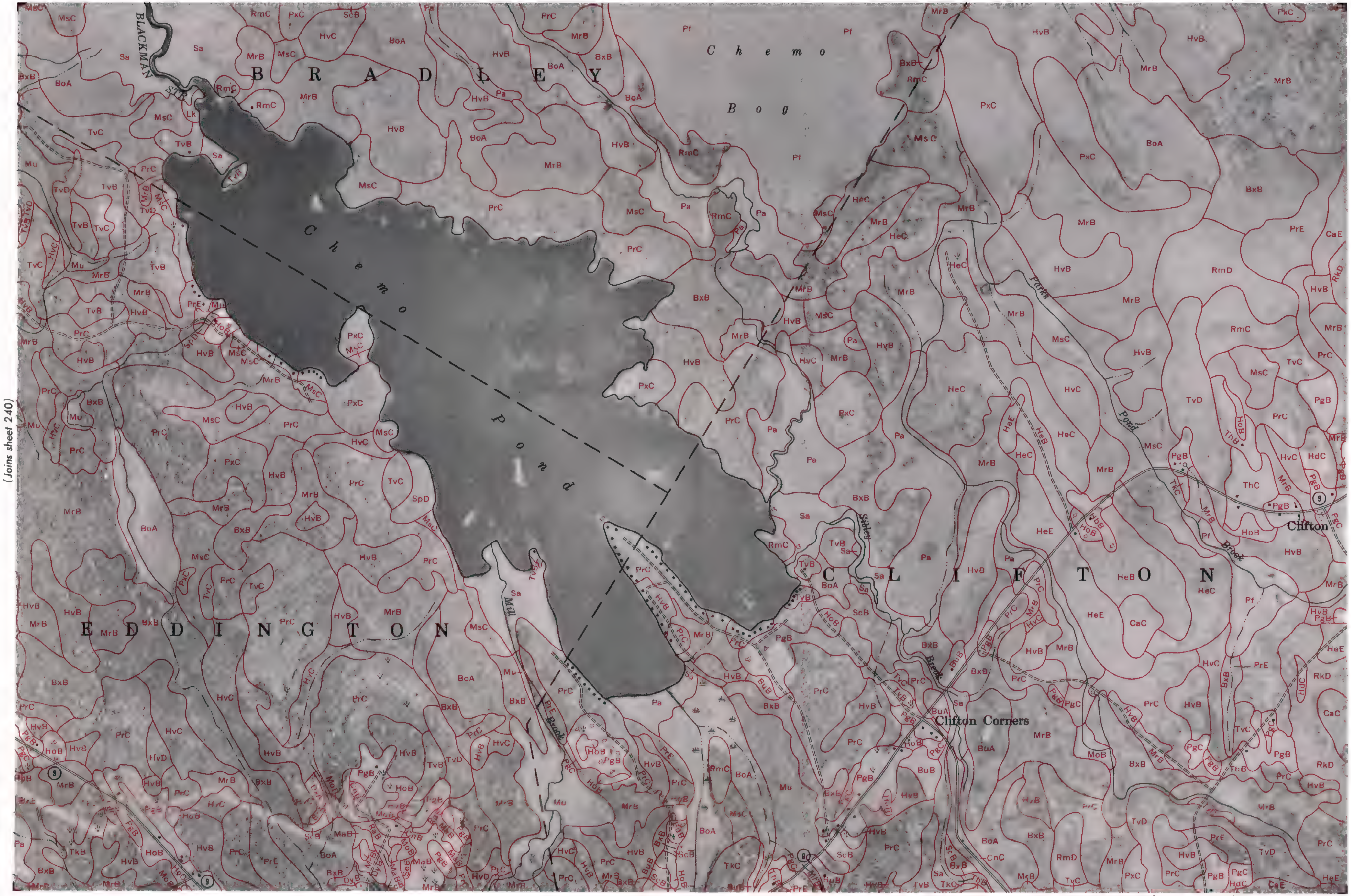
0 ½ 1 Mile

0 5000 Feet

(Joins sheet 232)

241

(Joins sheet 240)



(Joins sheet 242)

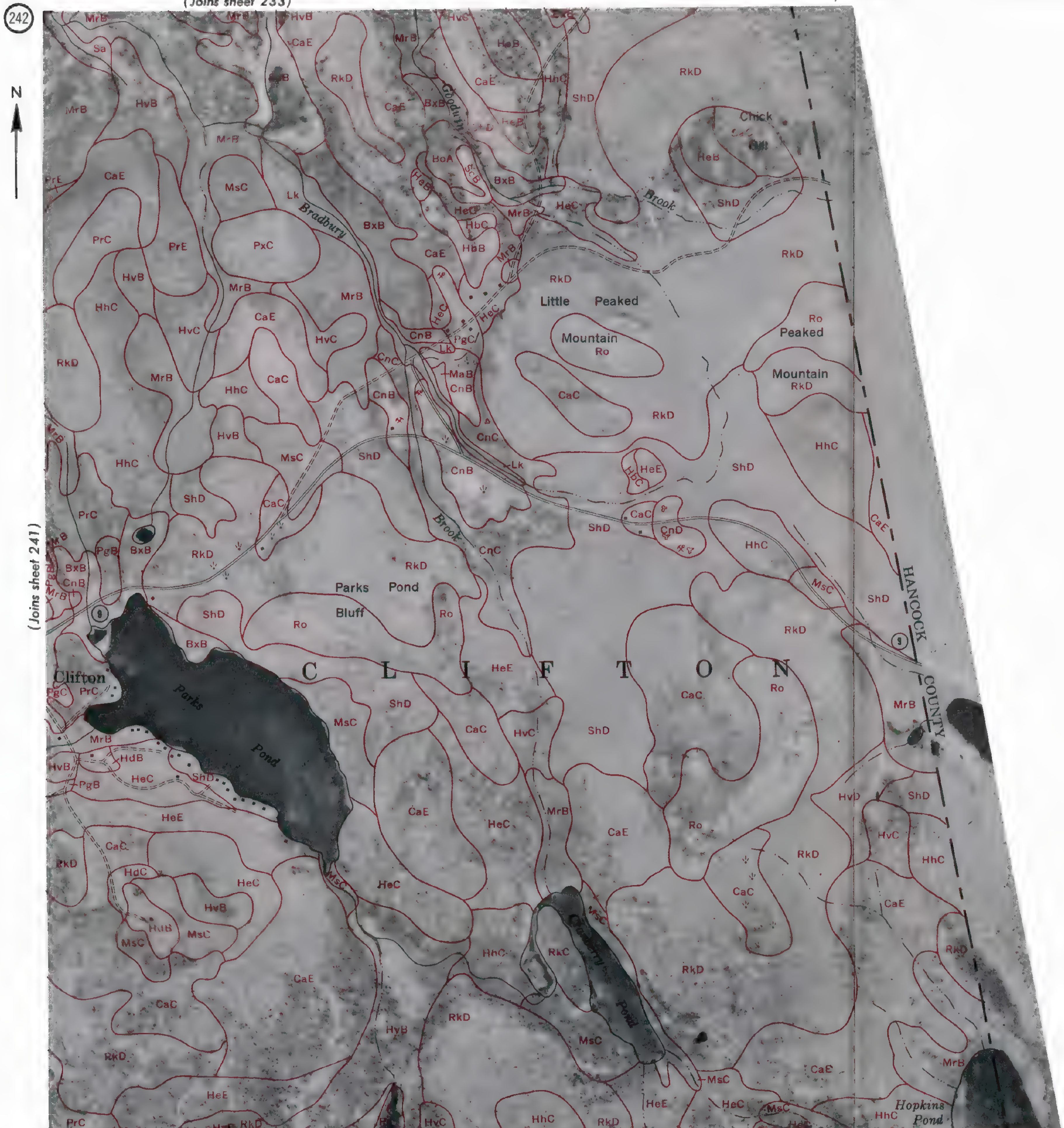
(Joins sheet 250)

0 ½ 1 Mile Scale 1:20 000 0 5000 Feet

This map is one of a set compiled in 1962, as part of a soil survey by the Soil Conservation Service, United States Department of Agriculture, and the Maine Agricultural Experiment Station.

(Joins sheet 233)

(Joins sheet 206)



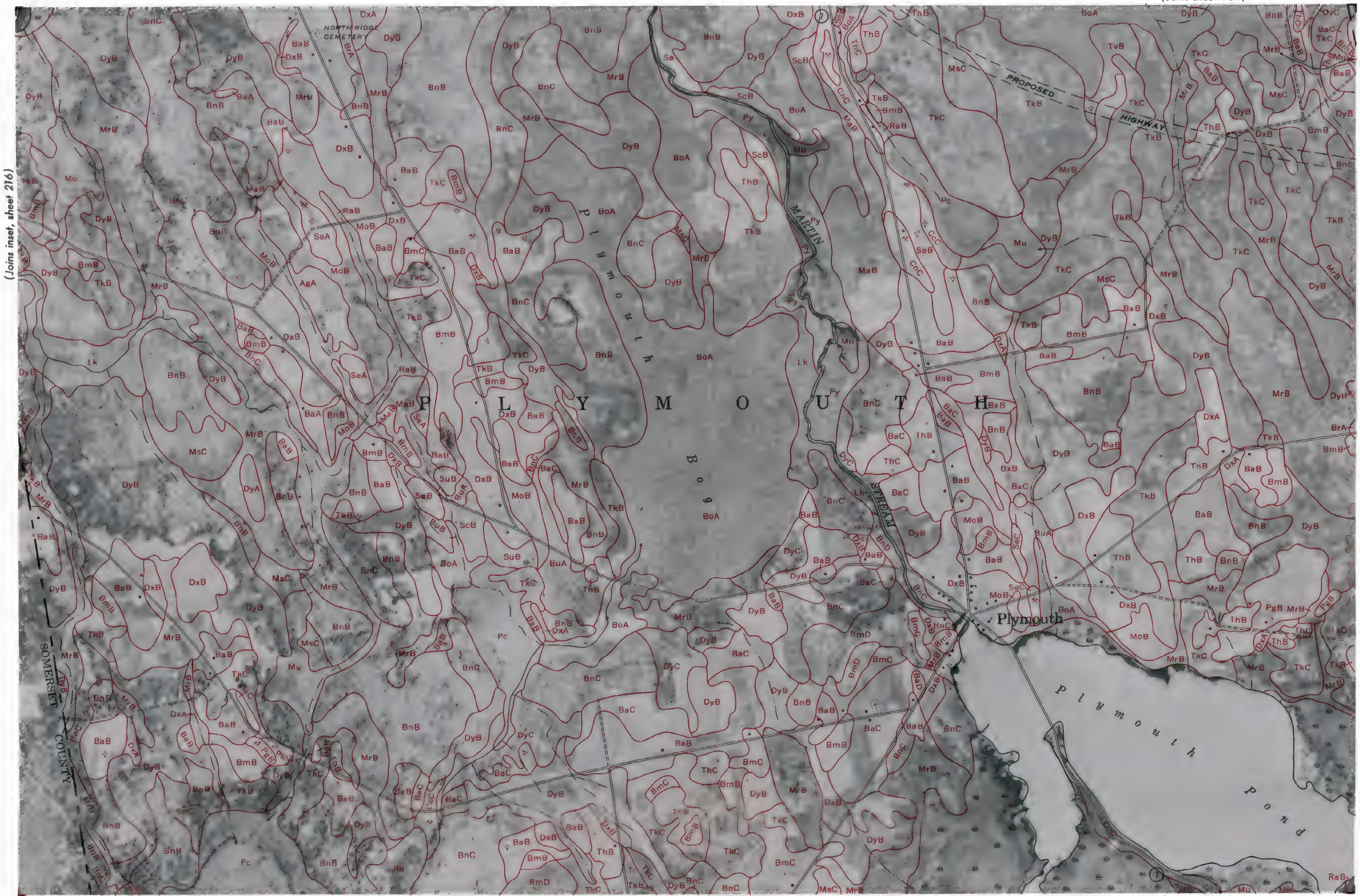
(Joins sheet 251)

0 ½ 1 Mile Scale 1:20 000 0 5000 Feet

(Joins inset, sheet 233)

(Joins sheet 234)

243



(Joins inset, sheet 216)

(Joins sheet 244)

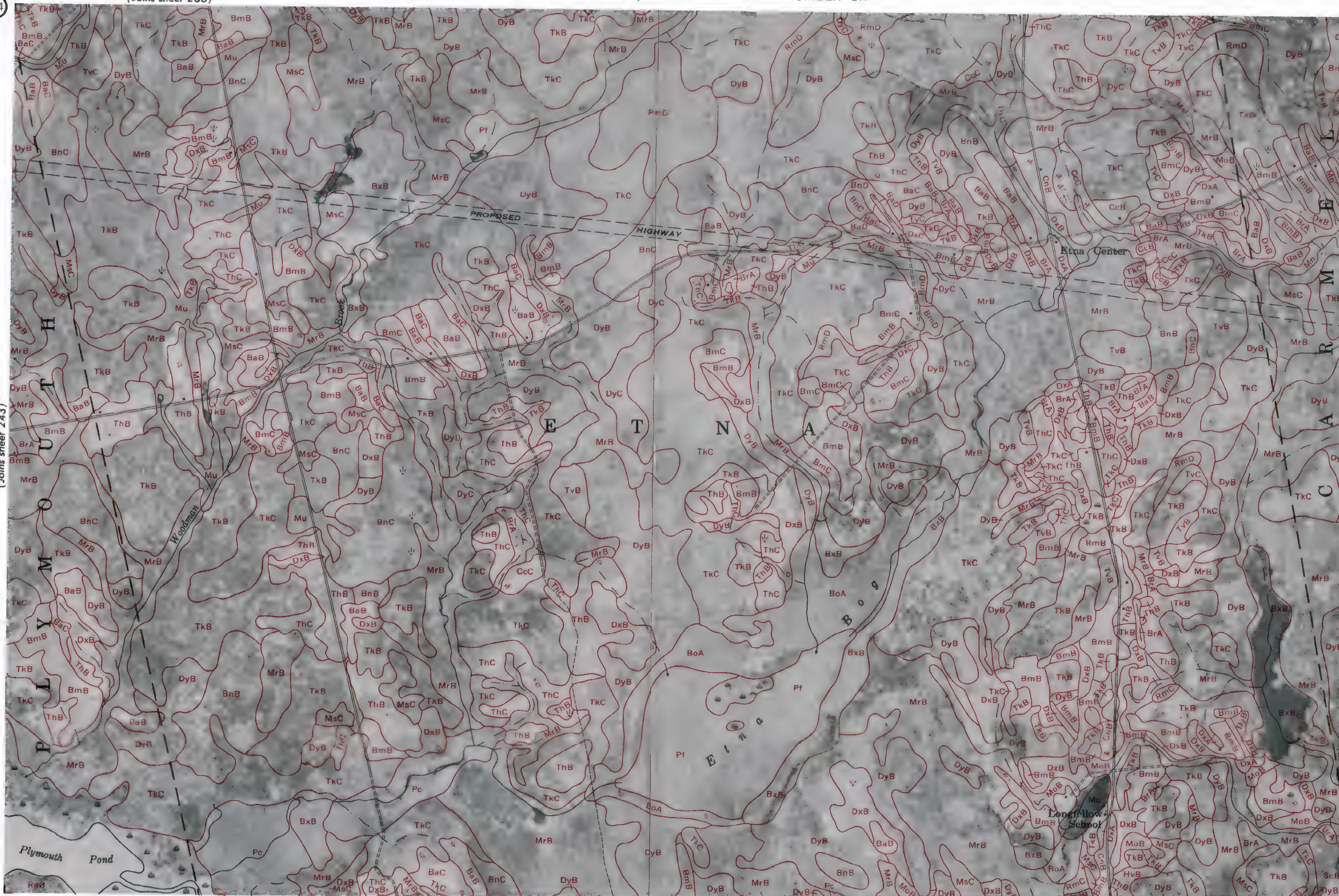
(Joins sheet 252)

0 ½ 1 Mile Scale 1:20 000 0 5000 Feet

This map is one of a set compiled in 1962, as part of a soil survey by the Soil Conservation Service, United States Department of Agriculture, and the Maine Agricultural Experiment Station.

244

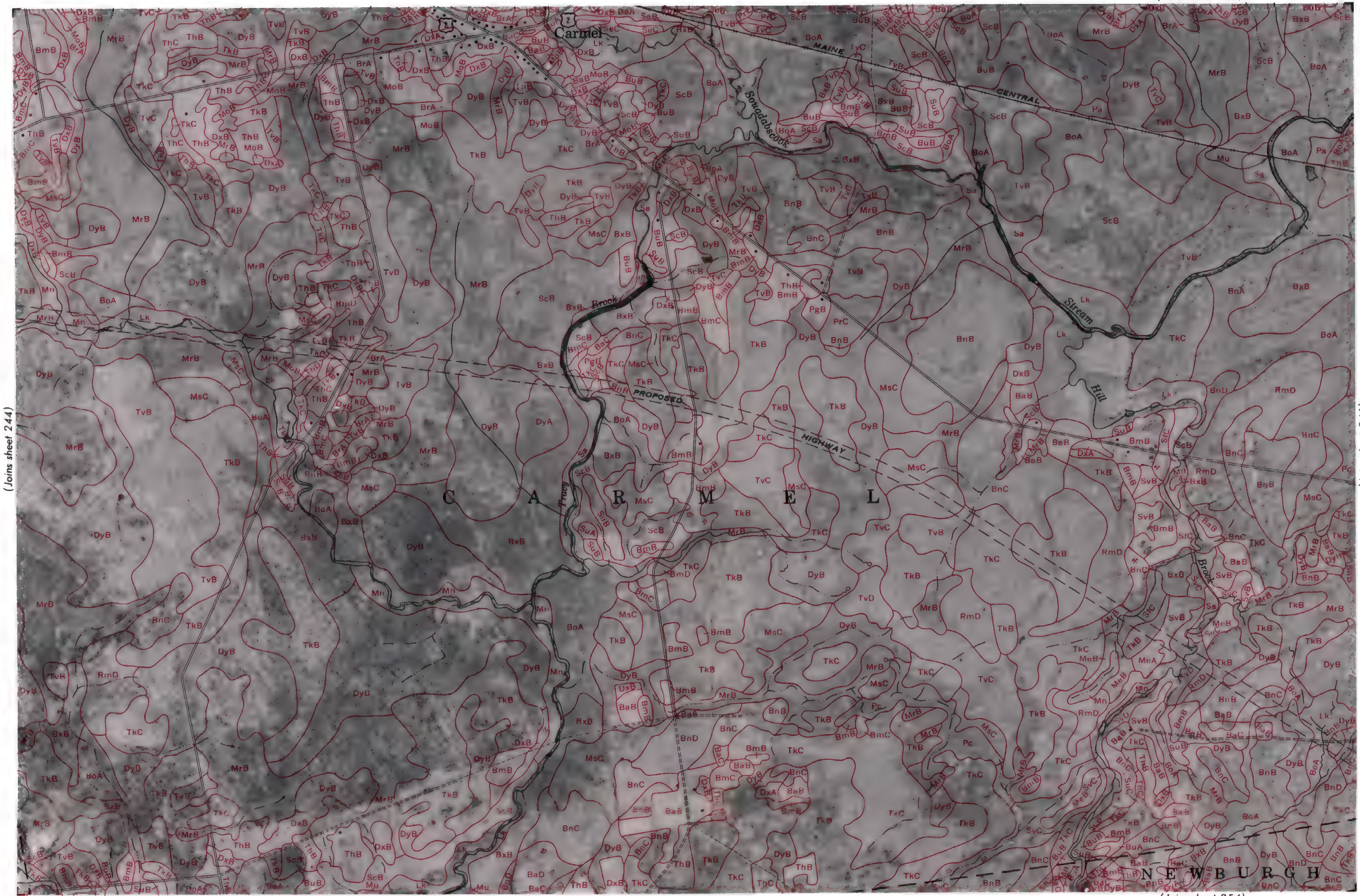
(Joins sheet 236)



(Joins sheet 253)

0 ½ 1 Mile Scale 1:20 000 0 5000 Feet

(Joins sheet 236)



(Joins sheet 244)

(Joins sheet 246)

(Joins sheet 254)

This map is one of a set compiled in 1962, as part of a soil survey by the Soil Conservation Service, United States Department of Agriculture, and the Maine Agricultural Experiment Station.

0 ½ 1 Mile Scale 1:20 000 0 5000 Feet

(Joins sheet 237)

(Joins sheet 245)

(Joins sheet 247)

(Joins sheet 255)

0 ½ 1 Mile Scale 1:20 000 0 5000 Feet

(Joins sheet 238)

247

(Joins sheet 246)

(Joins sheet 248)

(Joins sheet 256)

Scale 1:20 000

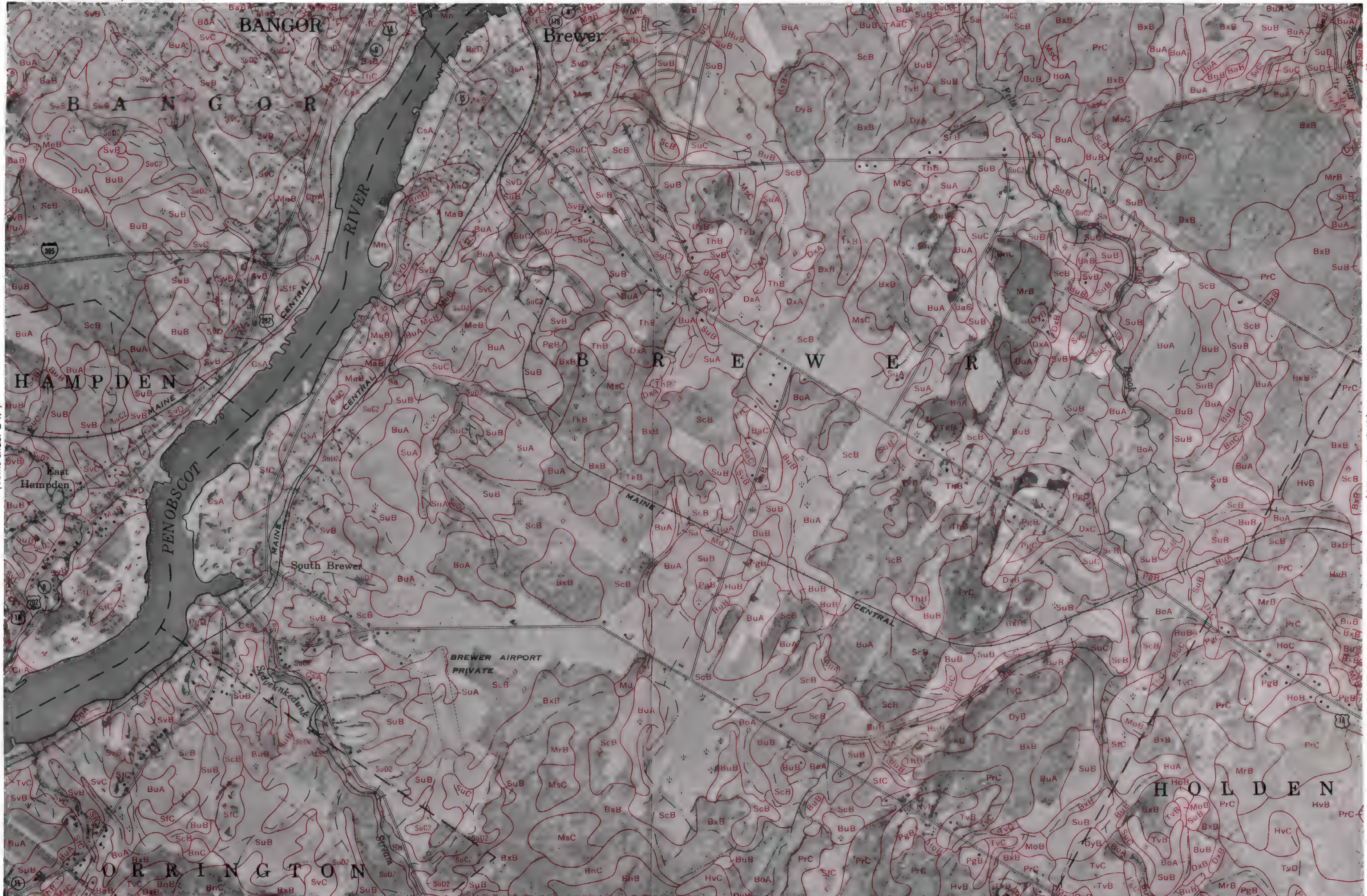
0 ½ 1 Mile

0 5000 Feet

This map is one of a set compiled in 1962, as part of a soil survey by the Soil Conservation Service, United States Department of Agriculture, and the Maine Agricultural Experiment Station.

248

(Joins sheet 239)



(Joins sheet 247)

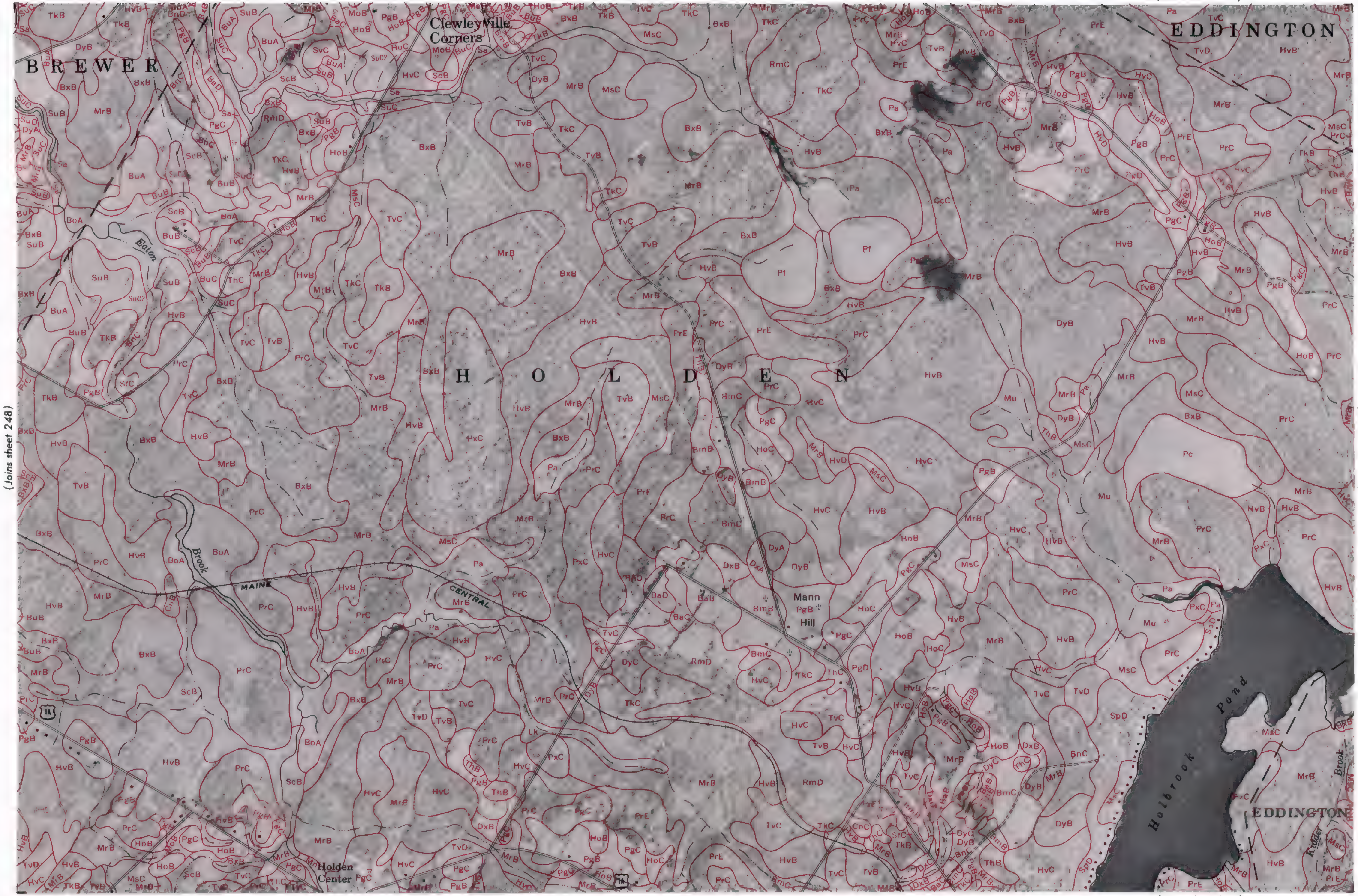
(Joins sheet 249)

(Joins sheet 257)

0 ½ 1 Mile Scale 1:20 000 0 5000 Feet

(Joins sheet 240)

(Joins sheet 248)



(Joins sheet 250)

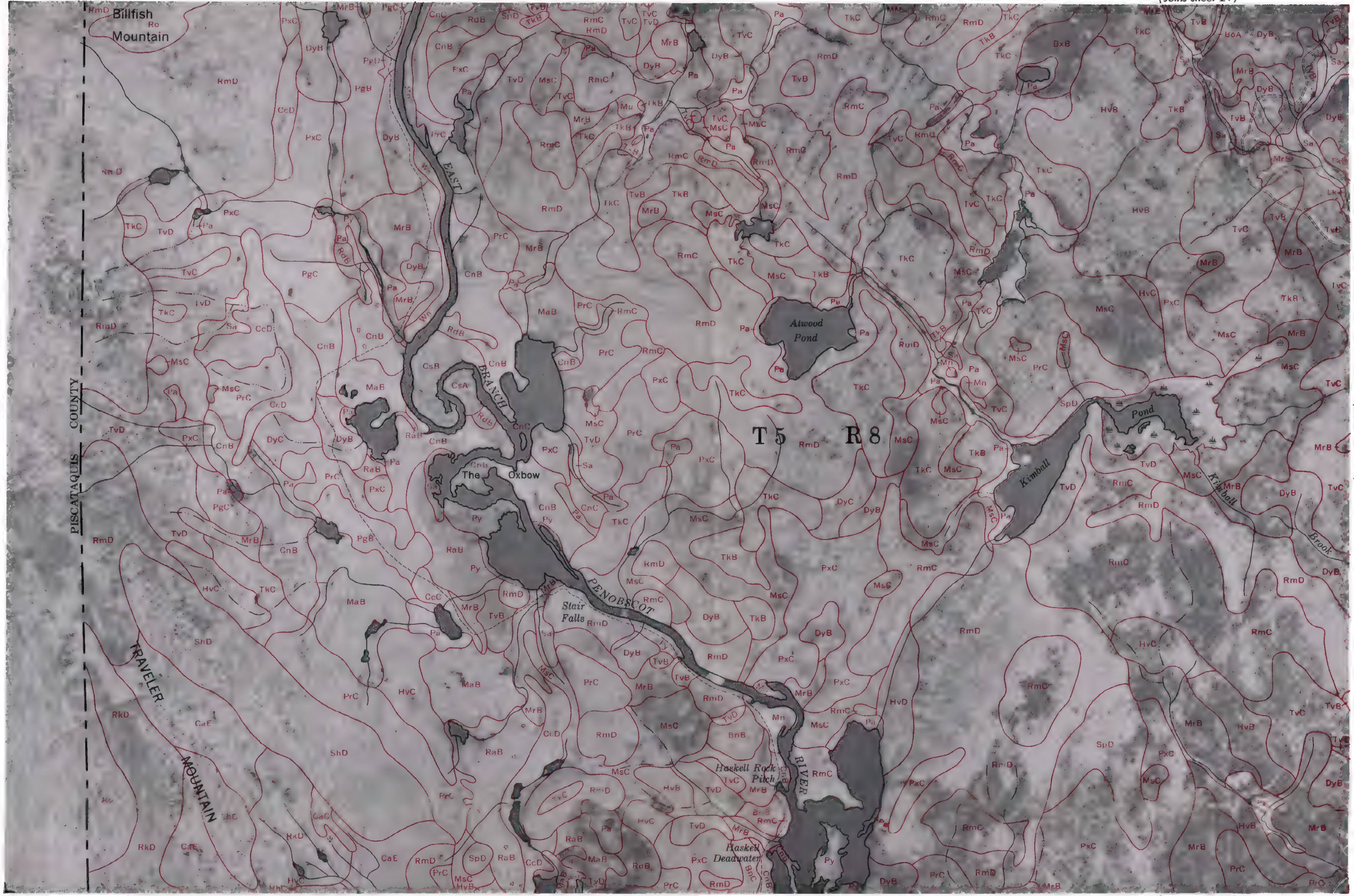
(Joins sheet 258)

0 ½ 1 Mile Scale 1:20 000 0 5000 Feet

This map is one of a set compiled in 1962, as part of a soil survey by the Soil Conservation Service, United States Department of Agriculture, and the Maine Agricultural Experiment Station.

(Joins sheet 21)

25



(Joins sheet 26)

(Joins sheet 29)

0 ½ 1 Mile Scale 1:20 000 0 5000 Feet

This map is one of a set compiled in 1962, as part of a soil survey by the Soil Conservation Service, United States Department of Agriculture, and the Maine Agricultural Experiment Station.

PENOBSCOT COUNTY, MAINE — SHEET NUMBER 250

(Joins sheet 241)

(Joins sheet 249)

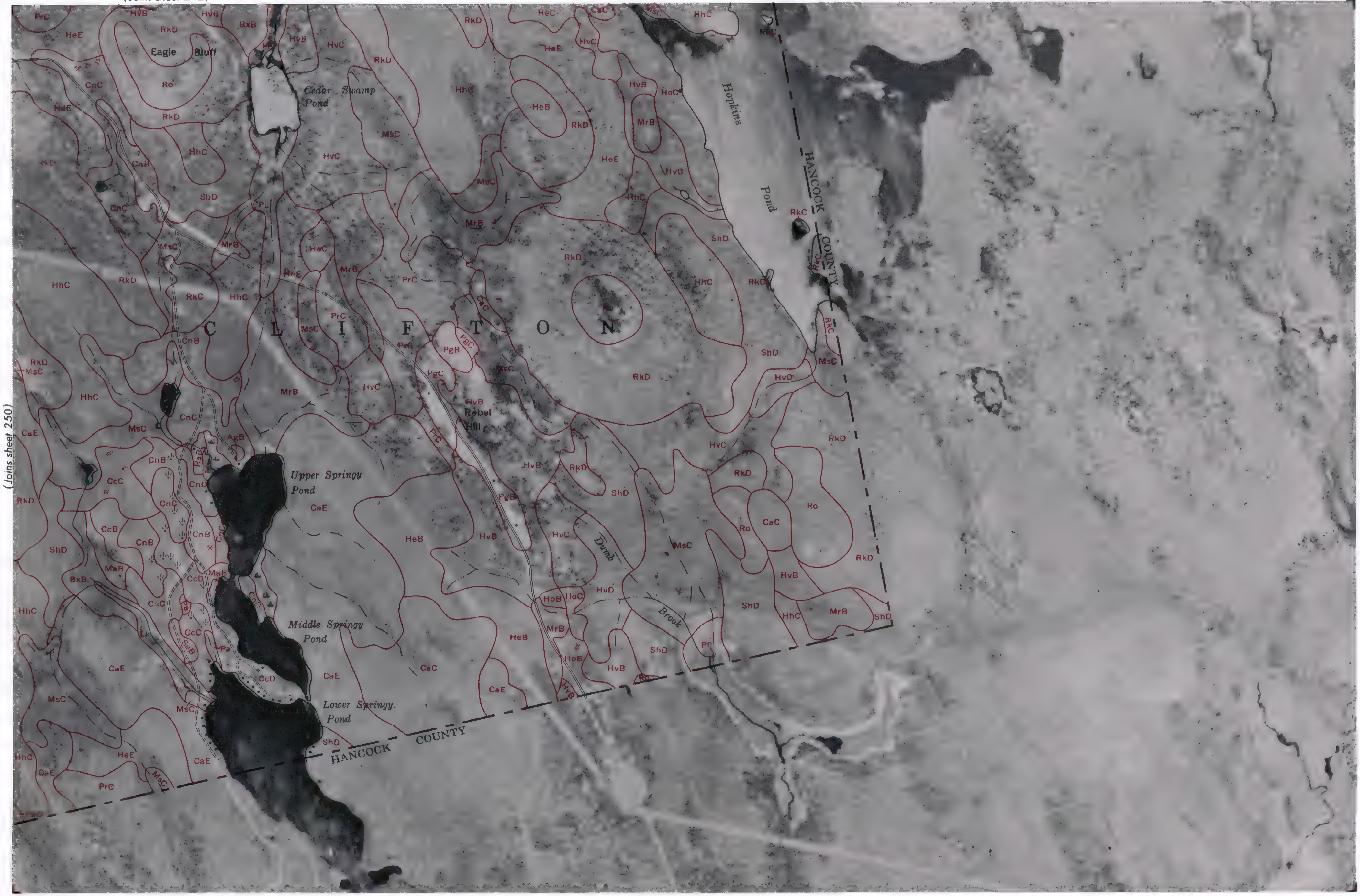
(Joins sheet 251)

(Joins sheet 259)

0 ½ 1 Mile Scale 1:20 000 0 5000 Feet

(Joins sheet 242)

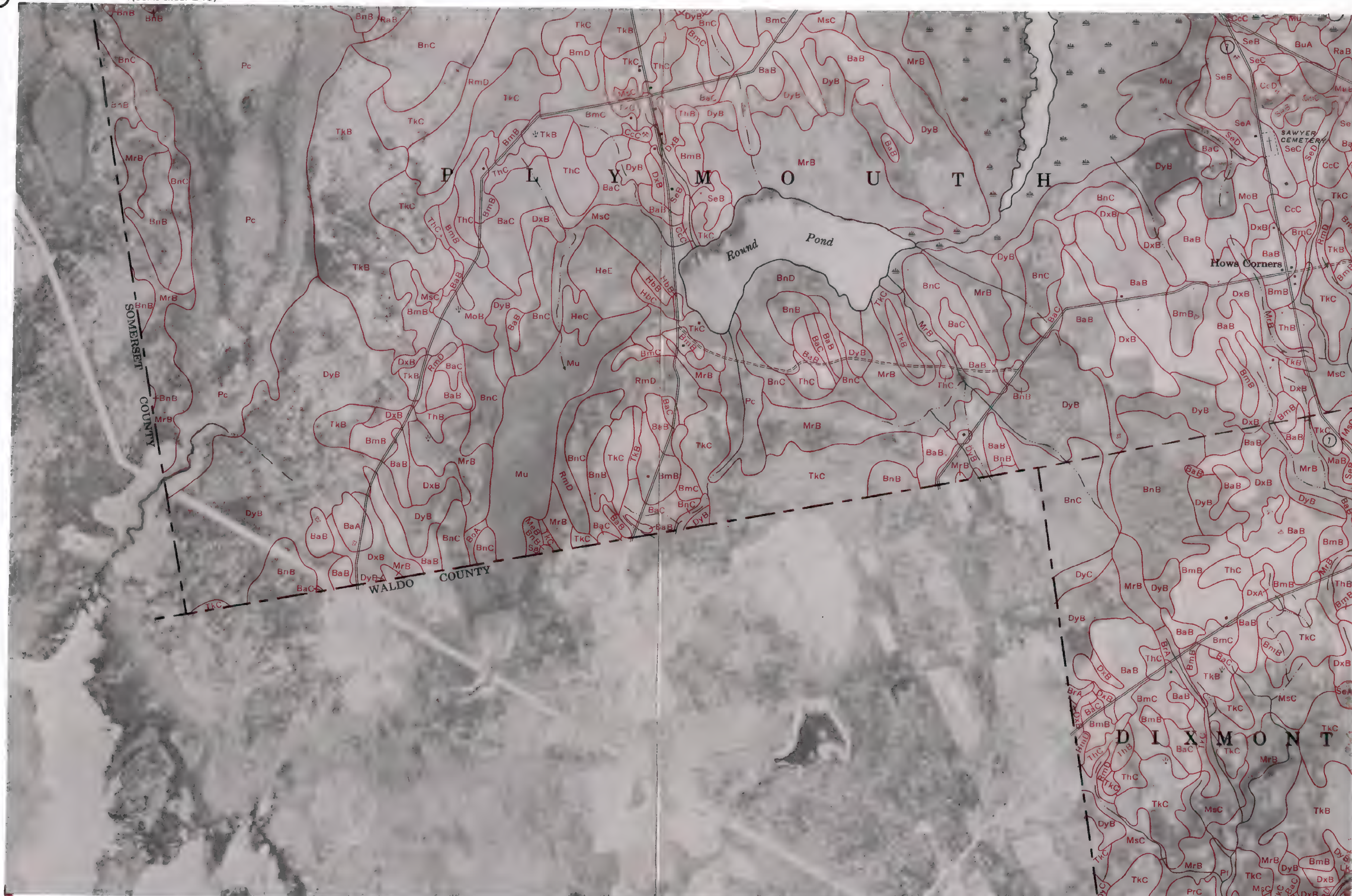
(Joins sheet 250)



This map is one of a set compiled in 1962, as part of a soil survey by the Soil Conservation Service, United States Department of Agriculture, and the Maine Agricultural Experiment Station.

252

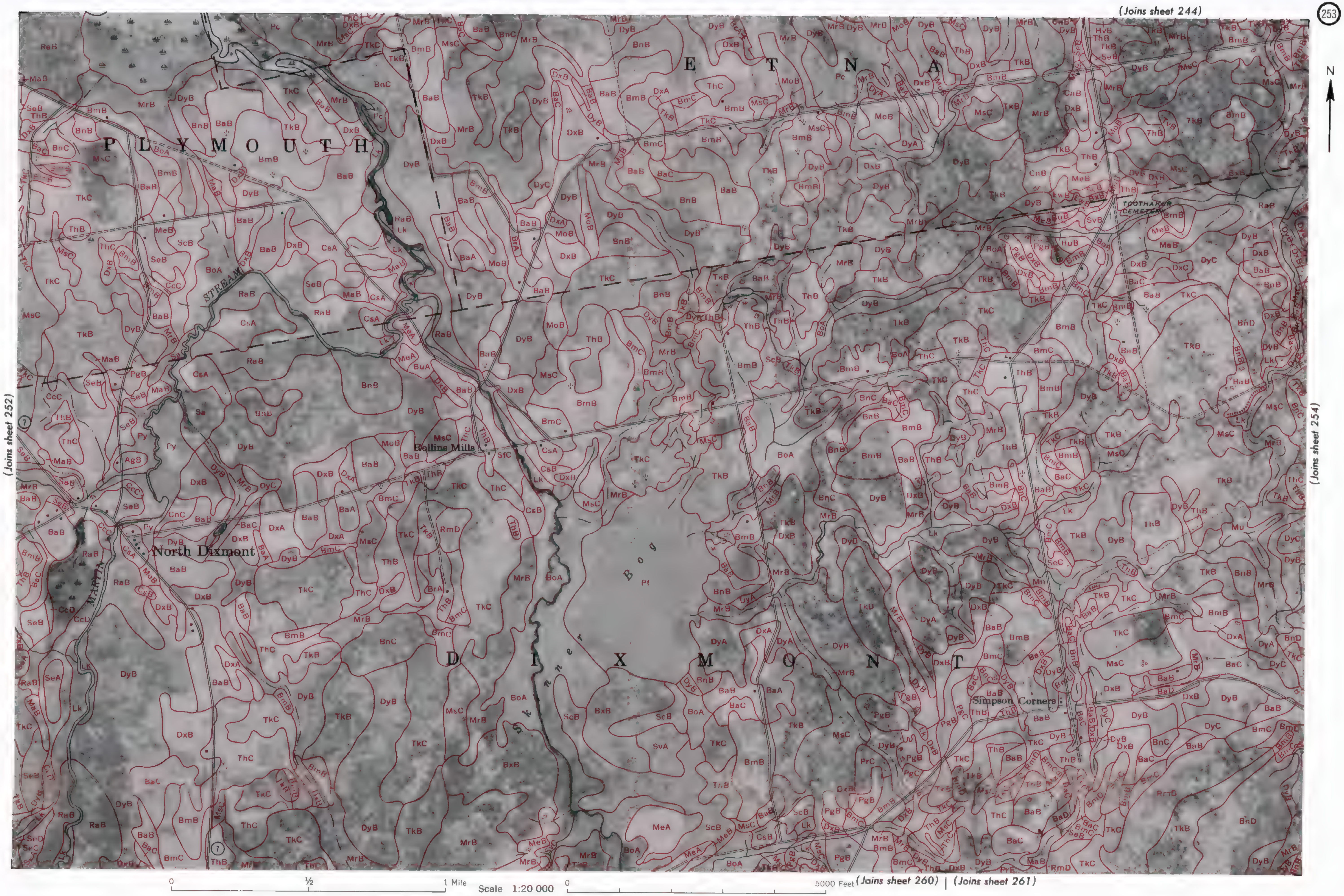
(Joins sheet 243)



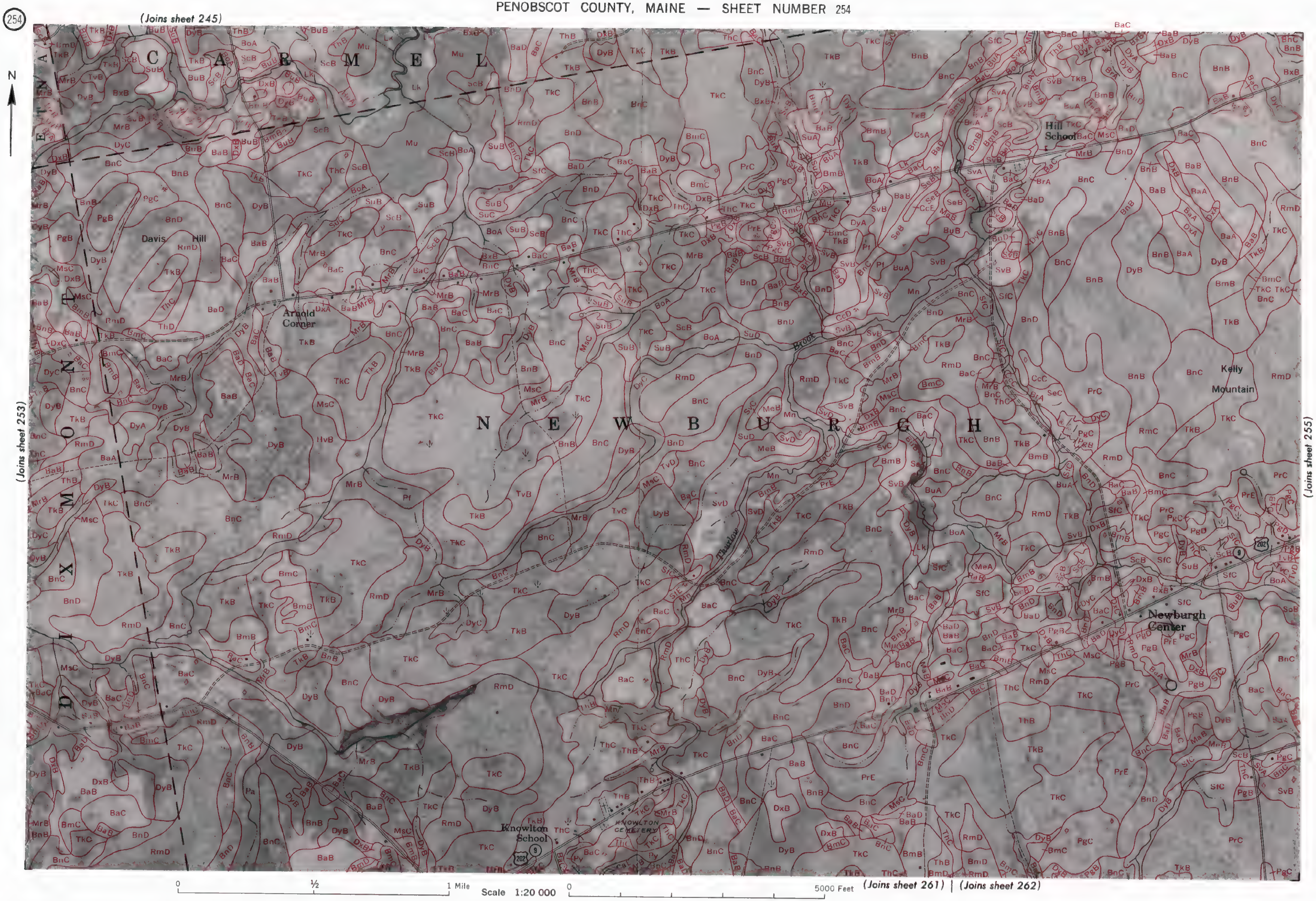
(Joins sheet 253)

0 ½ 1 Mile Scale 1:20 000 0 5000 Feet

(Joins sheet 260)



This map is one of a set compiled in 1962, as part of a soil survey by the Soil Conservation Service, United States Department of Agriculture, and the Maine Agricultural Experiment Station.

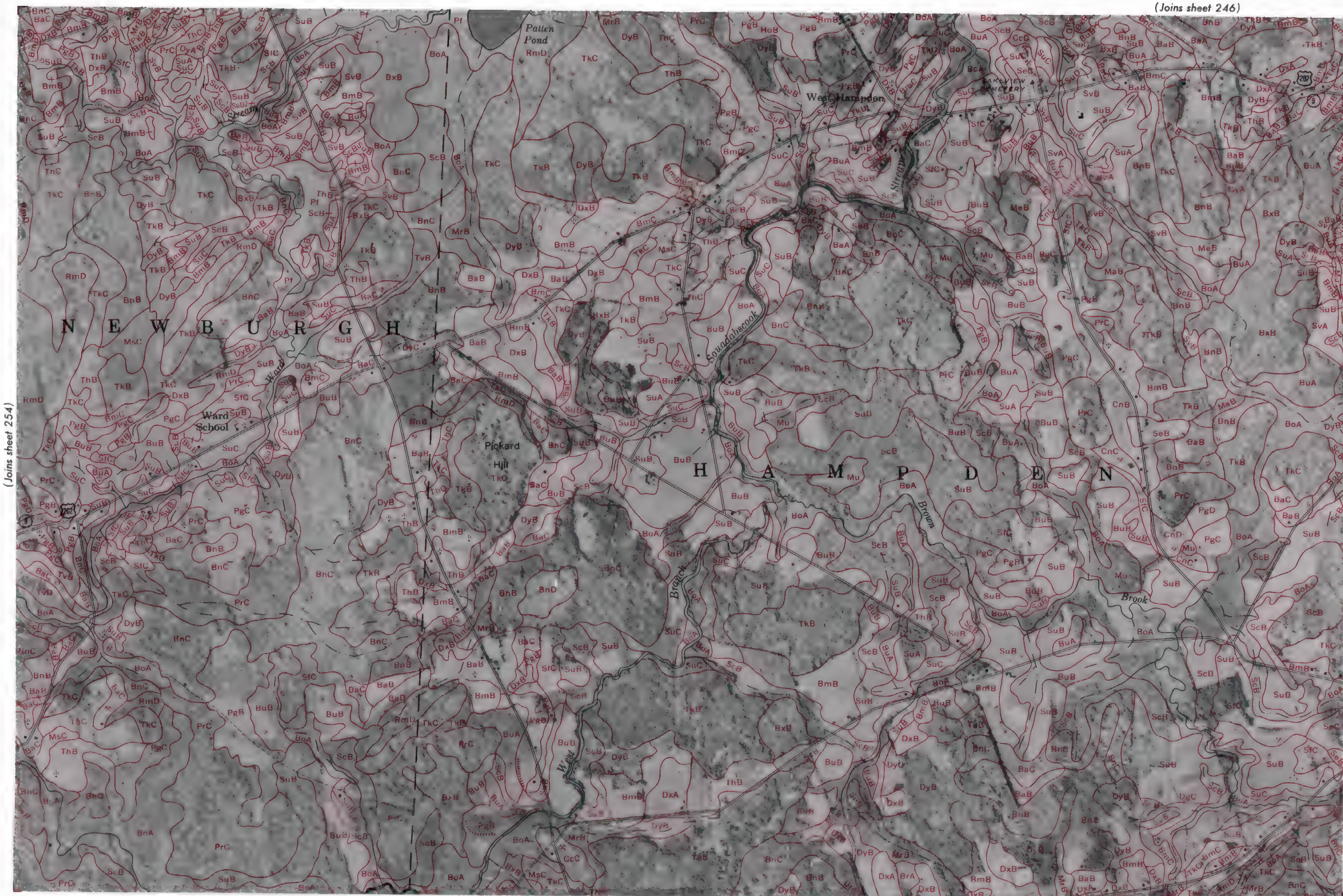

254
(Joins sheet 245)
(Joins sheet 253)
(Joins sheet 255)
(Joins sheet 261)
(Joins sheet 262)
N
CARMEL
ETNA
DIXMONT
NEWBURGH
Davis Hill
Arnold Corner
Brook
Thurlow
Hill School
Kelly Mountain
Newburgh Center
Knowlton School
KNOWLTON CEMETERY
0
½
1 Mile
Scale 1:20 000
0
5000 Feet

PENOBSCOT COUNTY, MAINE — SHEET NUMBER 255

255

(Joins sheet 246)

(Joins sheet 254)



(Joins sheet 256)

0 ½ 1 Mile Scale 1:20 000 0 5000 Feet

(Joins sheet 262) | (Joins sheet 263)

This map is one of a set compiled in 1962, as part of a soil survey by the Soil Conservation Service, United States Department of Agriculture, and the Maine Agricultural Experiment Station.

256

(Joins sheet 247)

(Joins sheet 255)

(Joins sheet 257)

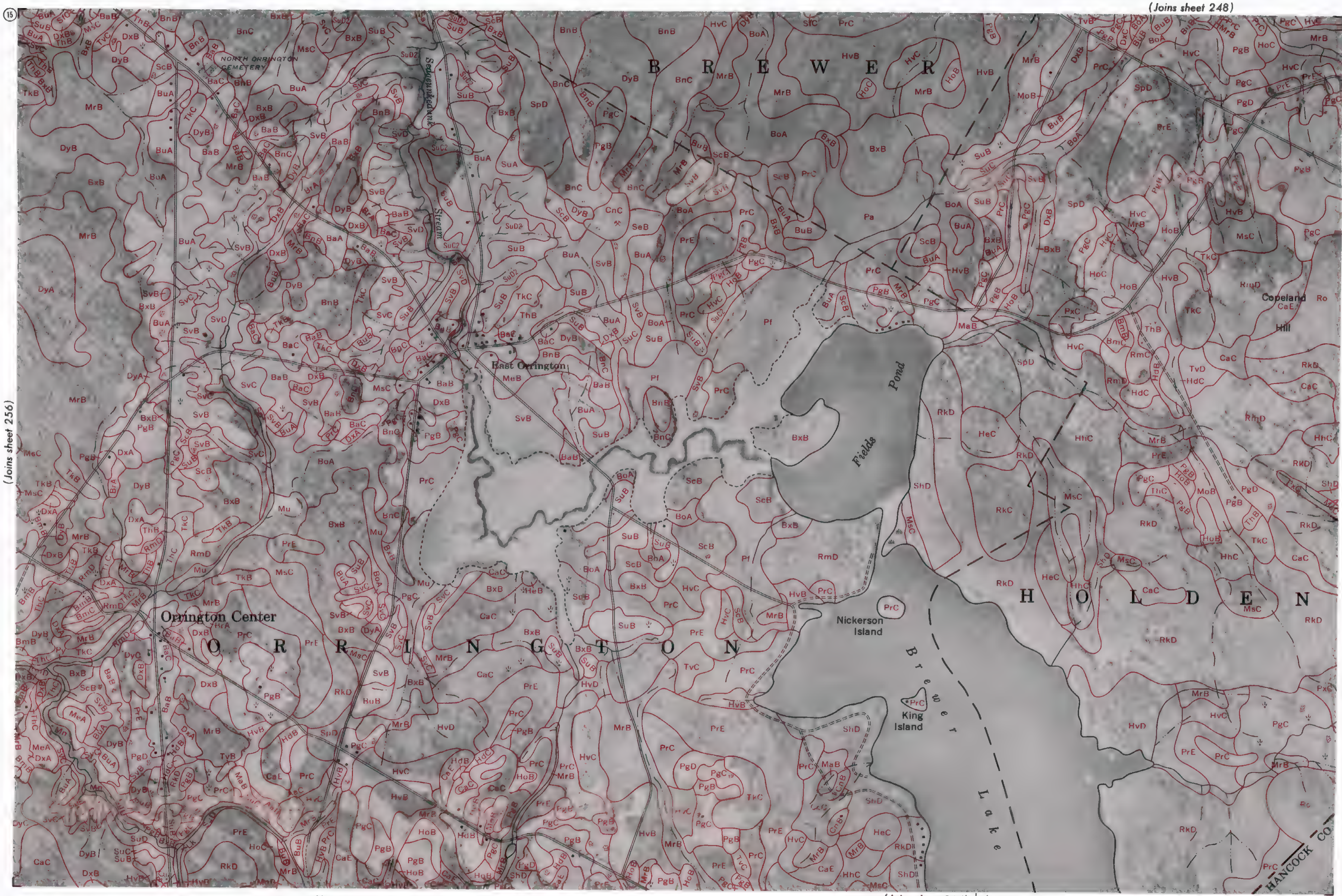
0 ½ 1 Mile Scale 1:20 000 0 5000 Feet

(Joins sheet 263) | (Joins sheet 264)

(15) (Joins sheet 248) (257)

N

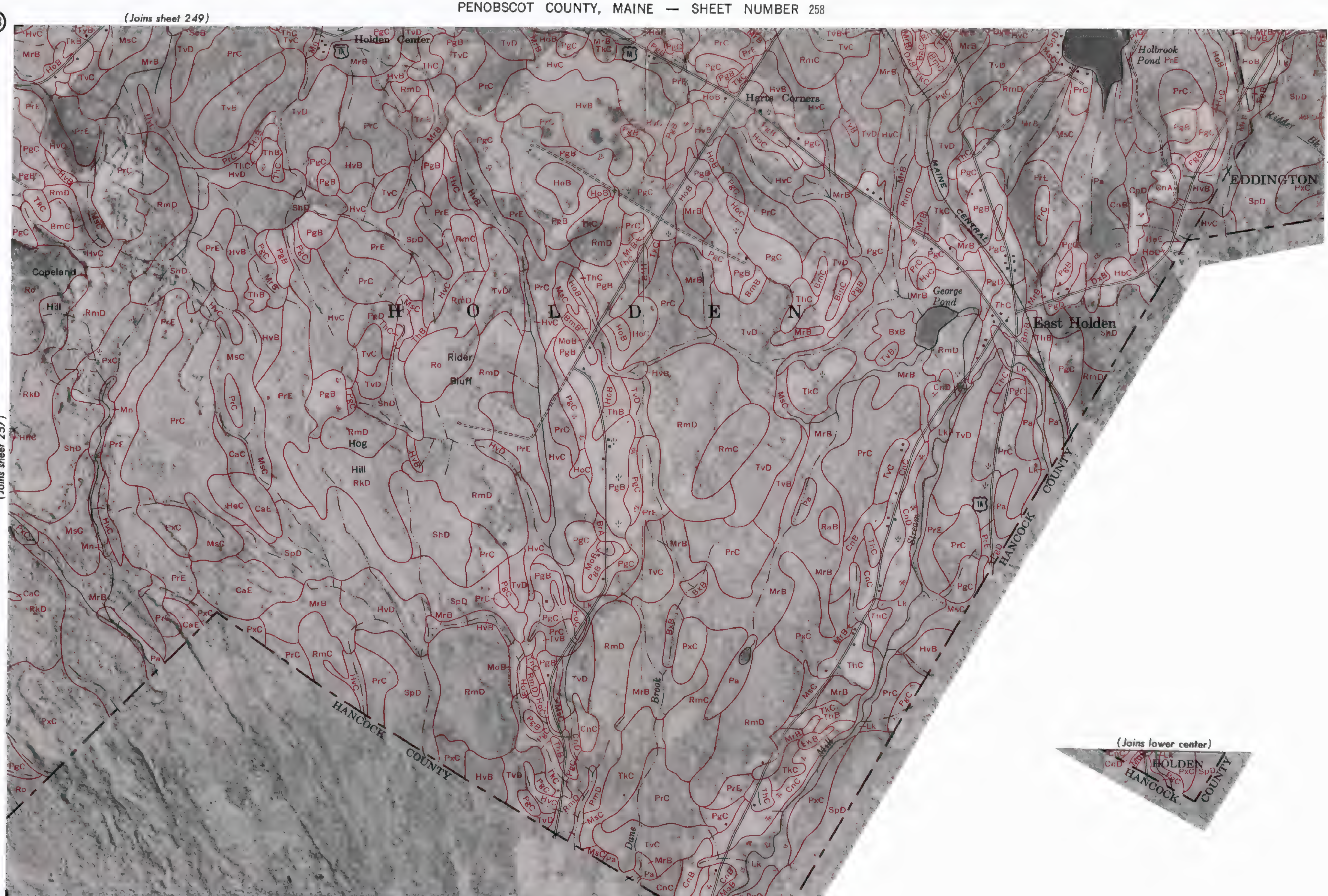
(Joins sheet 256)



(Joins sheet 258)

0 ½ 1 Mile Scale 1:20 000 0 5000 Feet (Joins sheet 264) | (Joins inset, sheet 259)

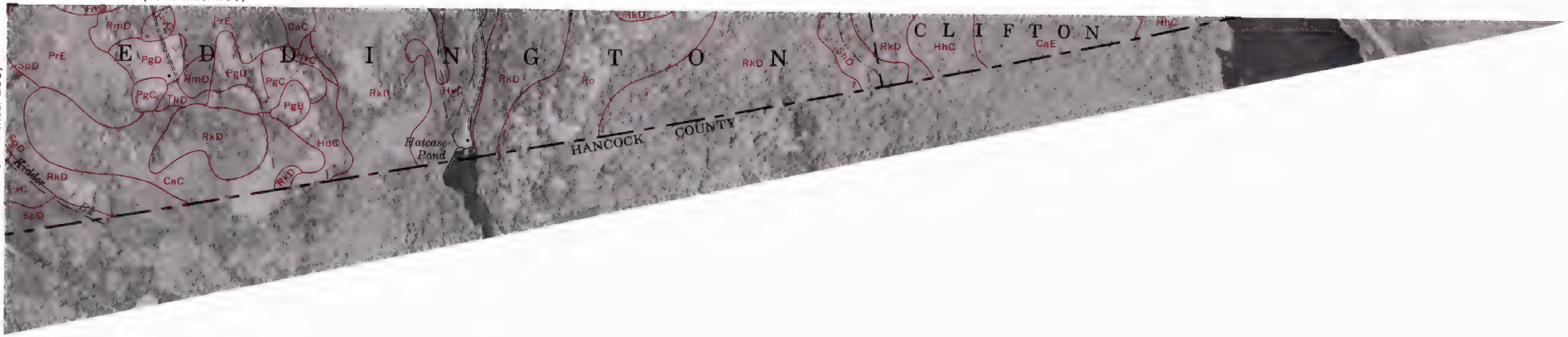
This map is one of a set compiled in 1962, as part of a soil survey by the Soil Conservation Service, United States Department of Agriculture, and the Maine Agricultural Experiment Station.



0 ½ 1 Mile Scale 1:20 000 0 5000 Feet

(Joins sheet 250)

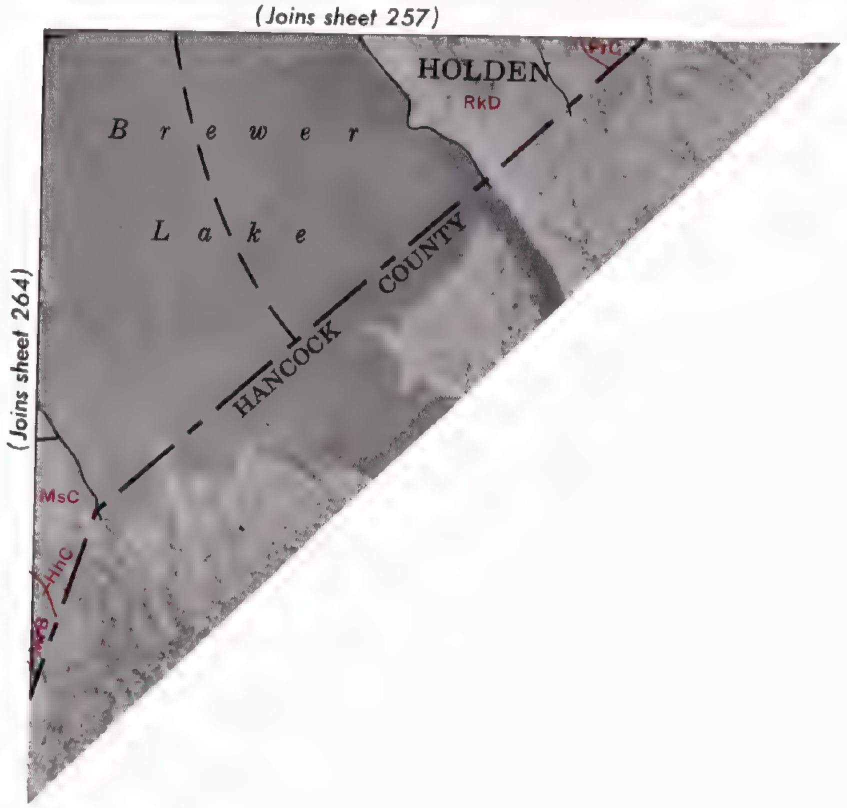
(Joins sheet 258)



N

(Joins sheet 257)

(Joins sheet 264)



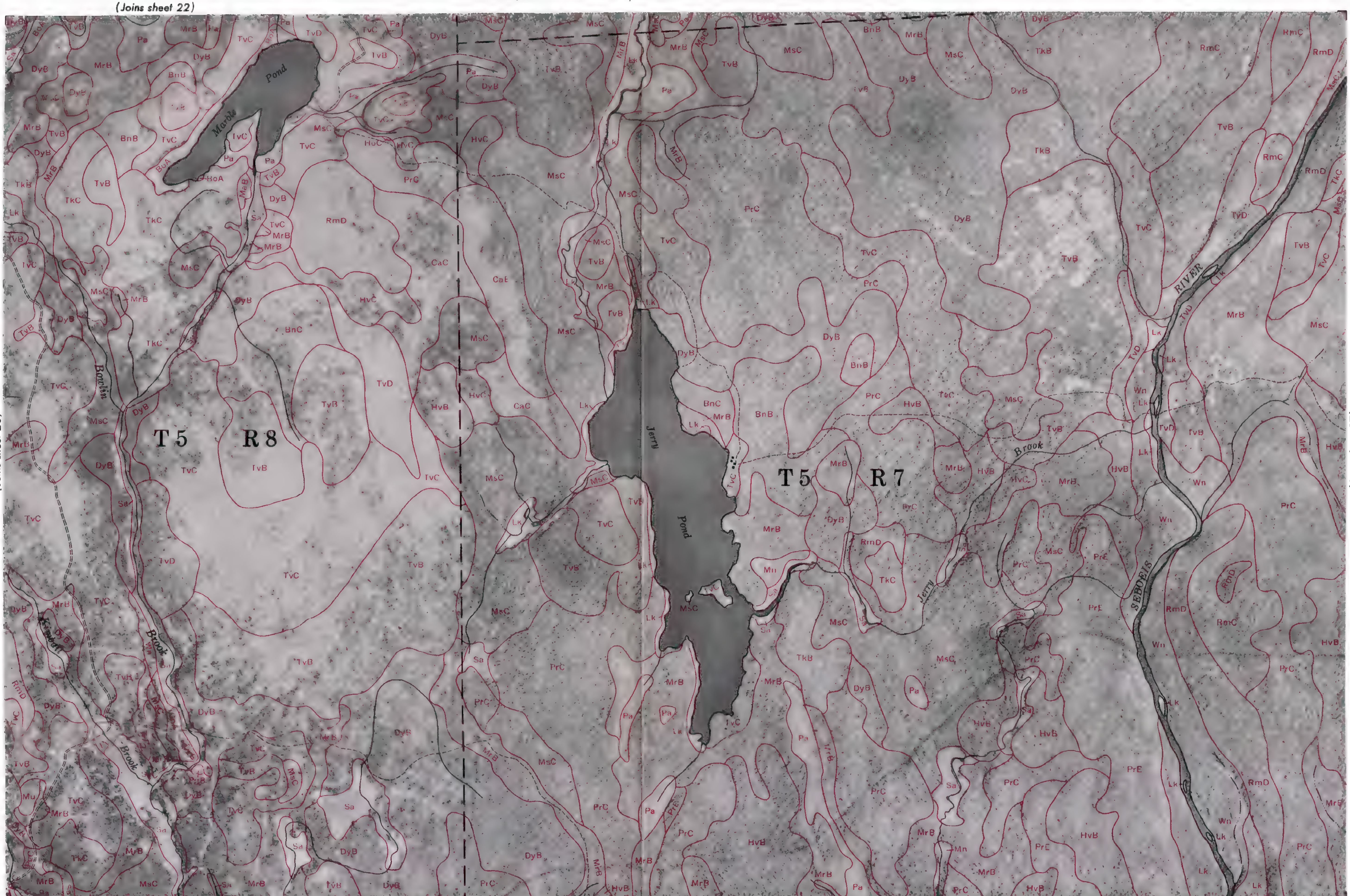
0 ½ 1 Mile Scale 1:20 000 0 5000 Feet

This map is one of a set compiled in 1962, as part of a soil survey by the Soil Conservation Service, United States Department of Agriculture, and the Maine Agricultural Experiment Station.

(26)

(Joins sheet 22)

(Joins sheet 25)



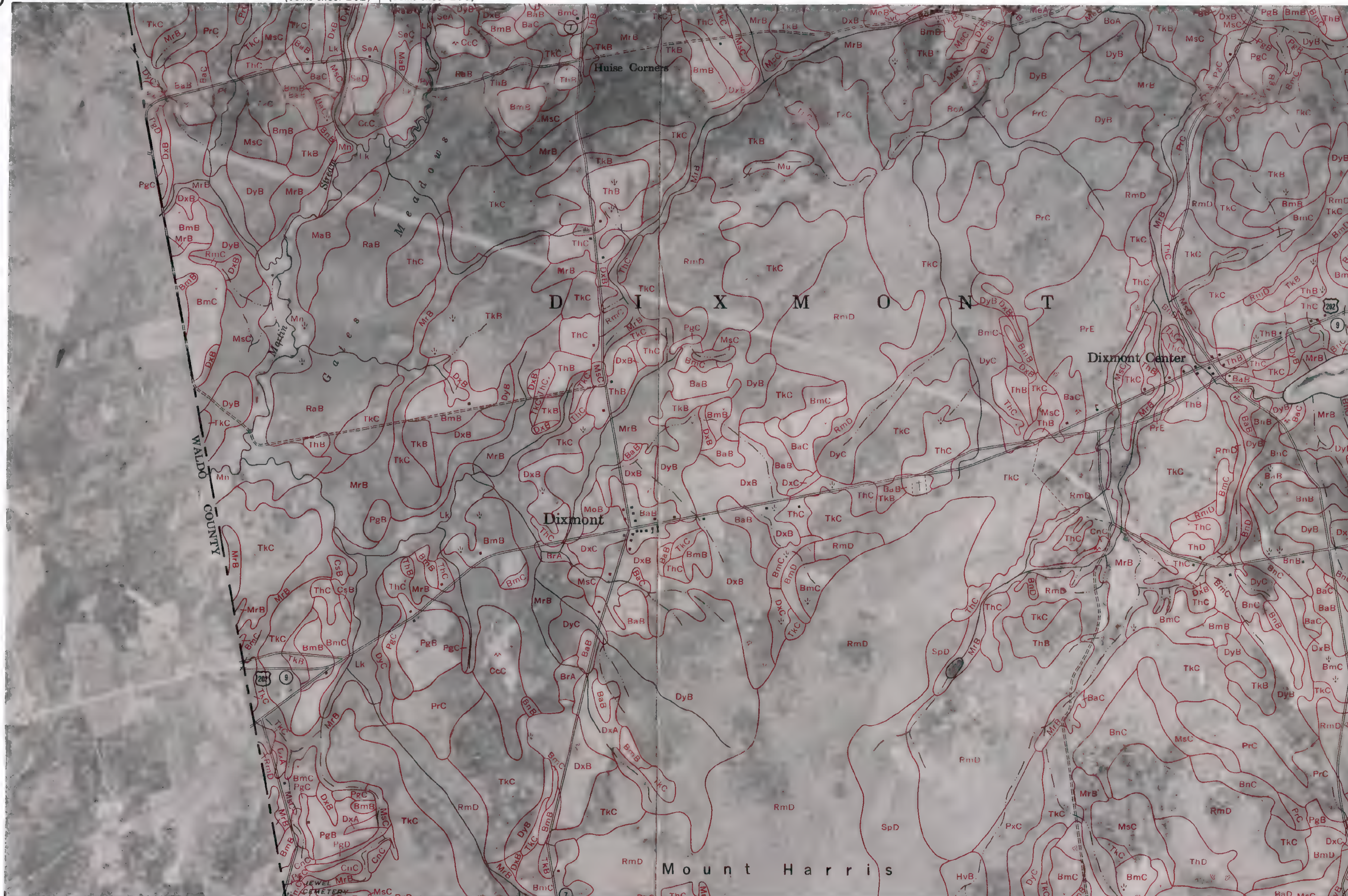
(Joins sheet 27)

(Joins sheet 30)

0 ½ 1 Mile Scale 1:20 000 0 5000 Feet

260

(Joins sheet 252) | (Joins sheet 253)



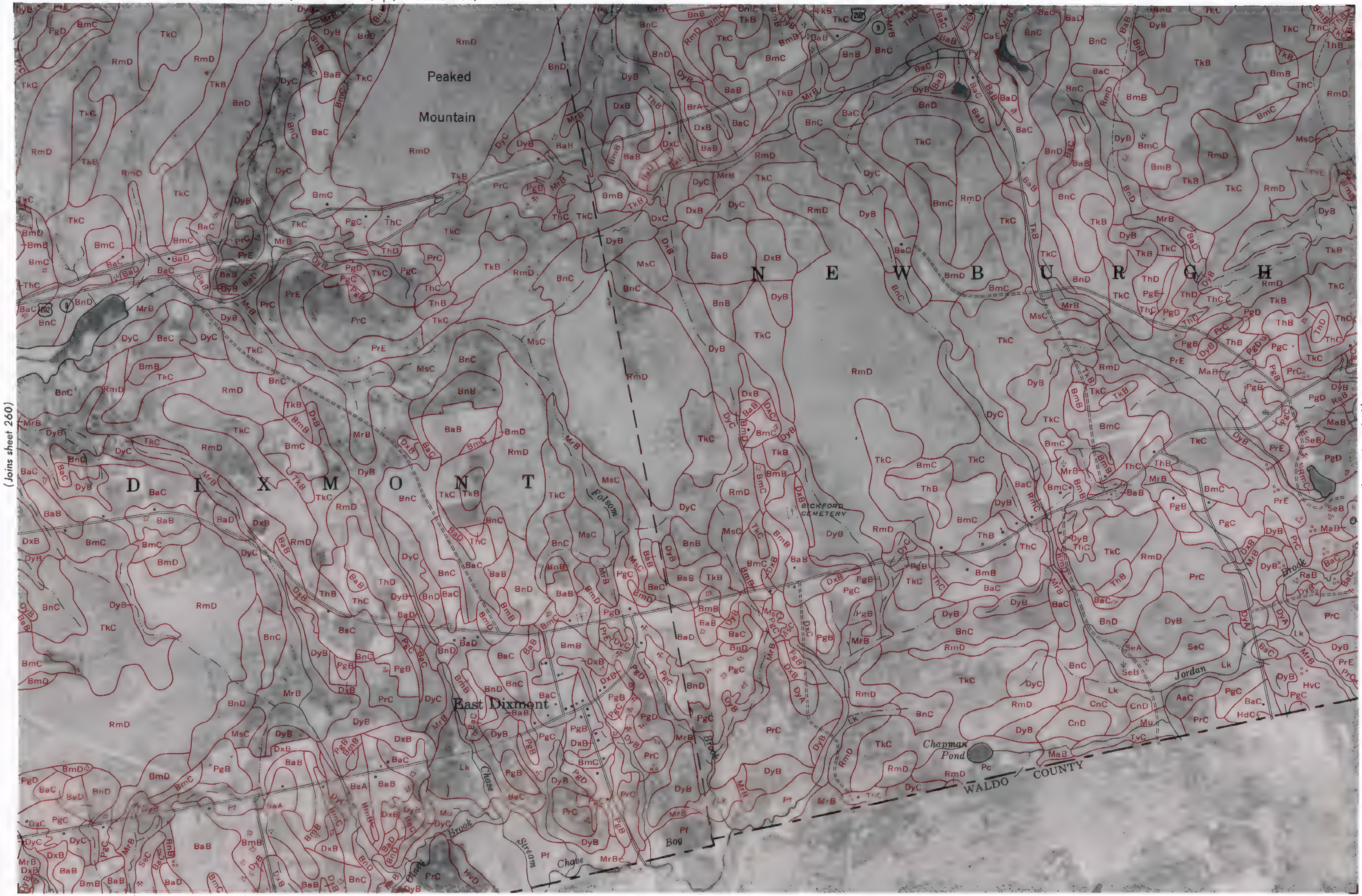
(Joins sheet 261)

(Joins inset, sheet 263)

0 ½ 1 Mile Scale 1:20 000 0 5000 Feet

(Joins sheet 253) | (Joins sheet 254)

(Joins sheet 260)



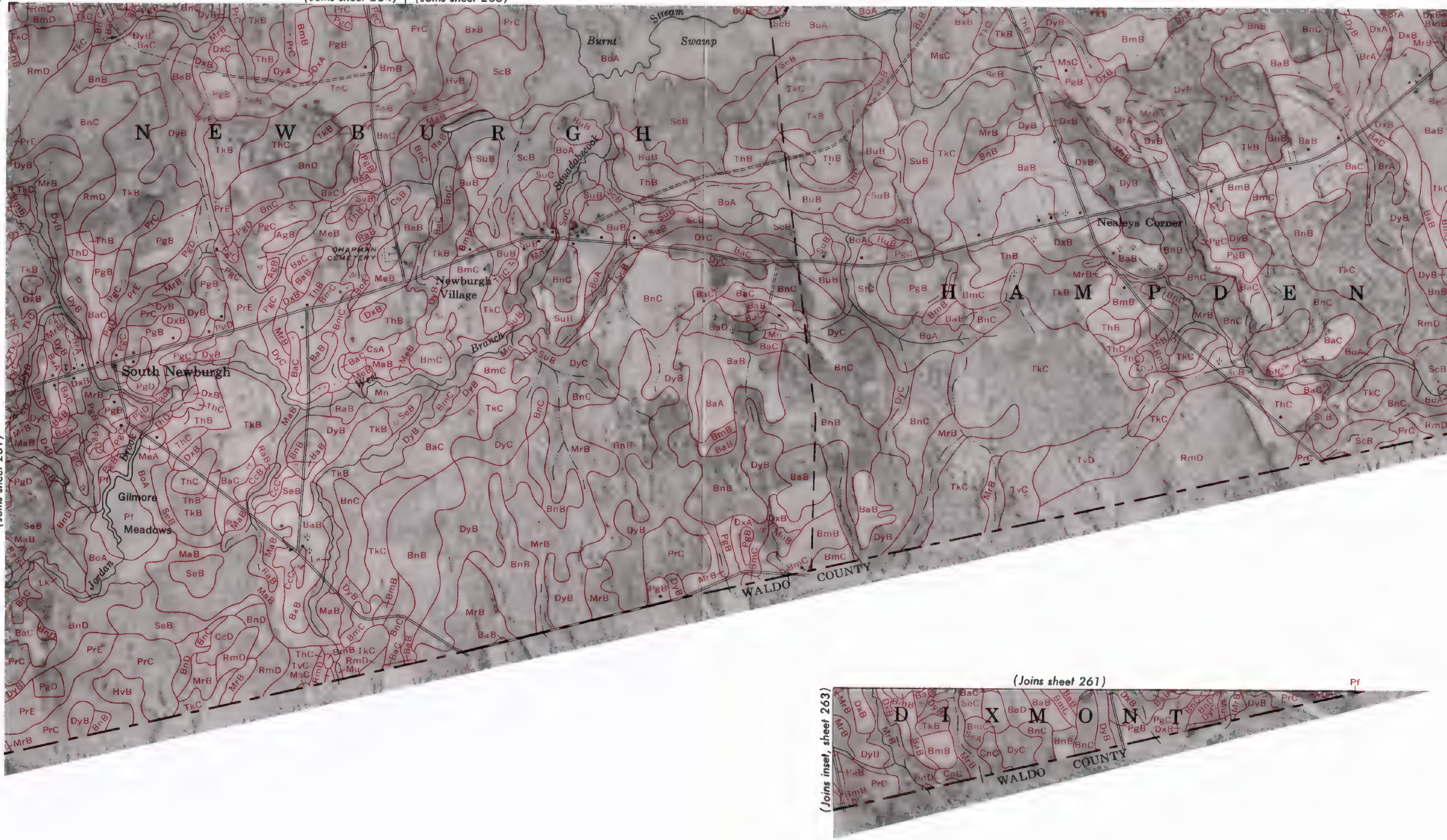
(Joins sheet 262)

(Joins inset, sheet 262)

0 ½ 1 Mile Scale 1:20 000 0 5000 Feet

This map is one of a set compiled in 1962, as part of a soil survey by the Soil Conservation Service, United States Department of Agriculture, and the Maine Agricultural Experiment Station.

(Joins sheet 254) | (Joins sheet 255)



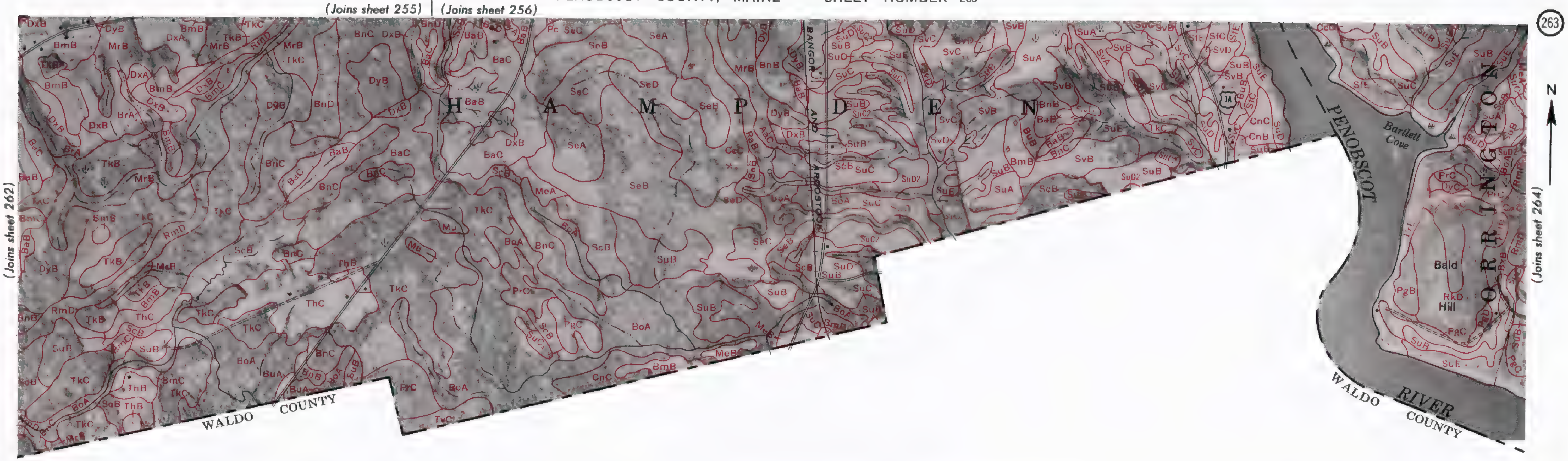
(Joins sheet 261)

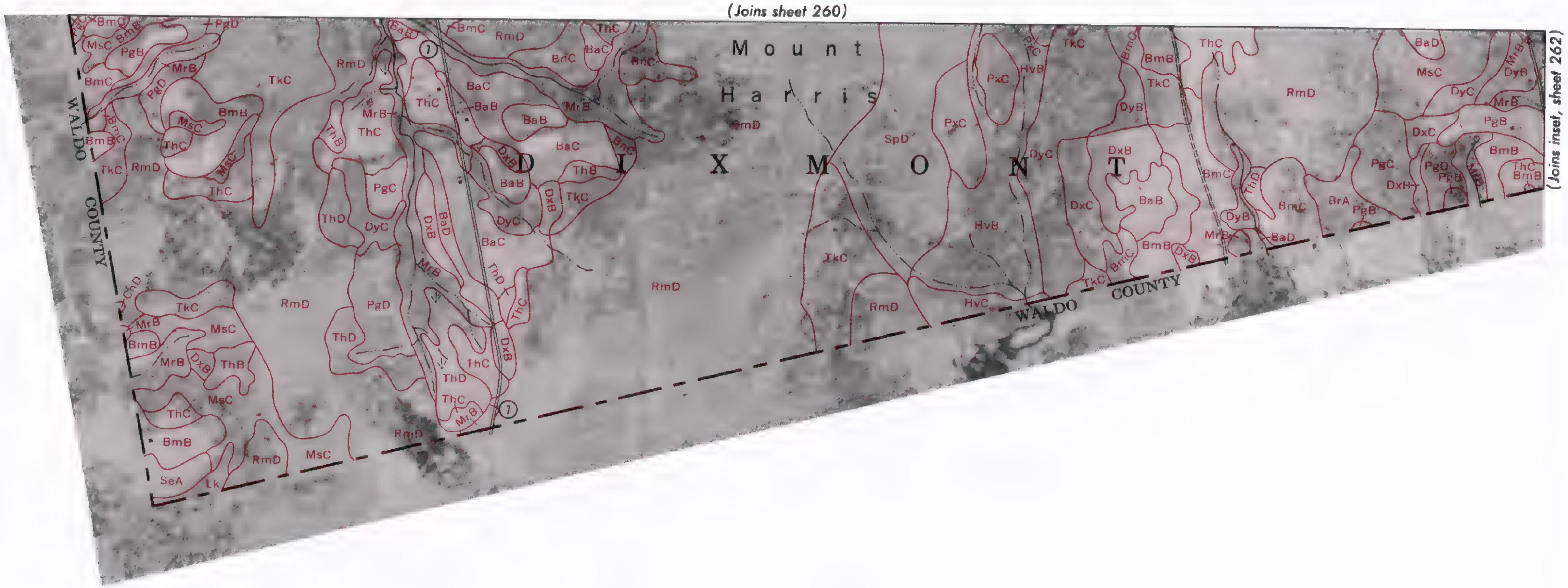
(Joins sheet 263)

(Joins sheet 261)

(Joins inset, sheet 263)

0 ½ 1 Mile Scale 1:20 000 0 5000 Feet





This map is one of a set compiled in 1962, as part of a soil survey by the Soil Conservation Service, United States Department of Agriculture, and the Maine Agricultural Experiment Station.

0 ½ 1 Mile Scale 1:20 000 0 5000 Feet

264

(Joins sheet 256) | (Joins sheet 257)

(Joins sheet 263)

(Joins inset, sheet 259)

N

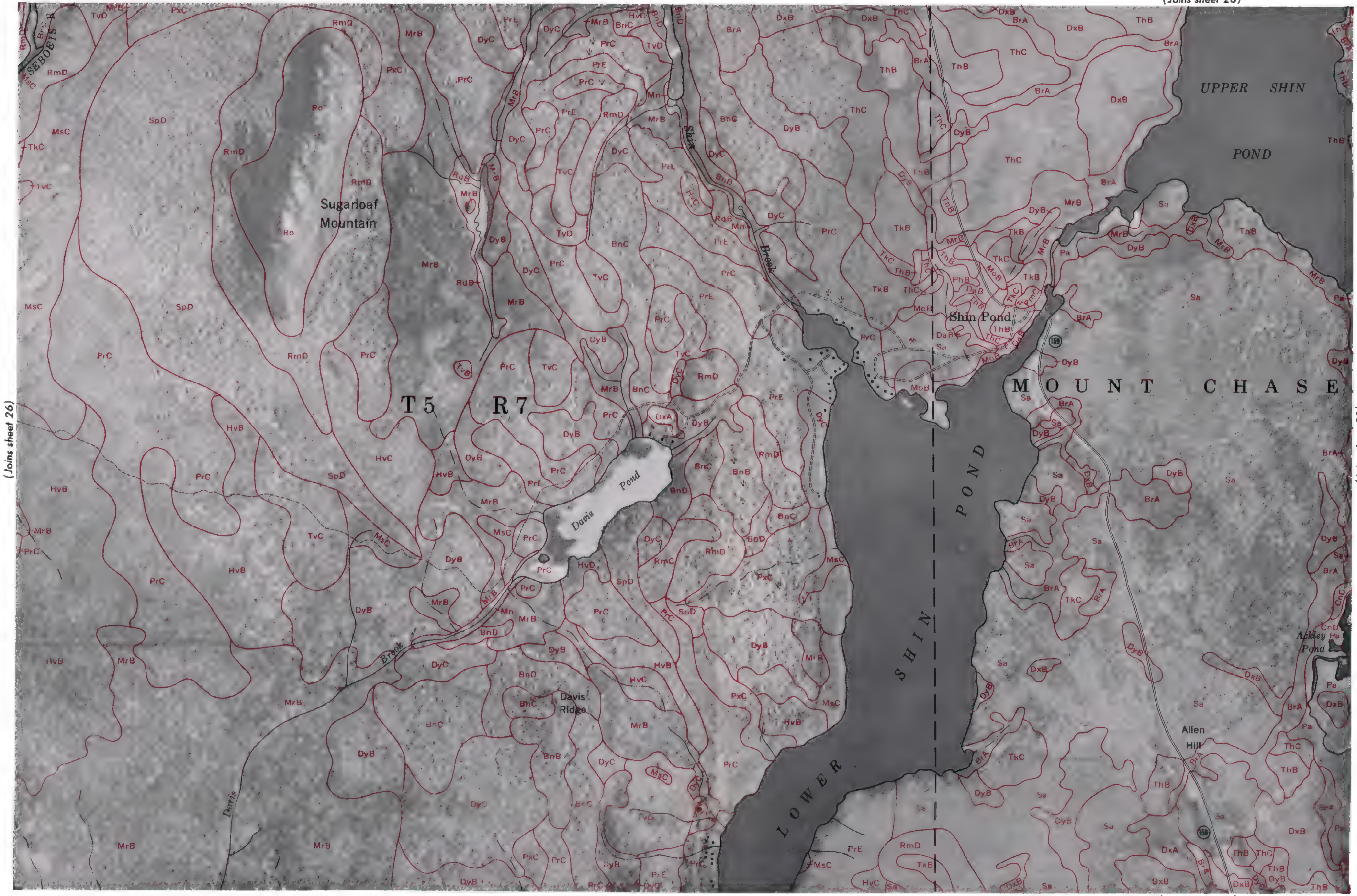
Scale 1:20 000

0 ½ 1 Mile

0 5000 Feet

(Joins sheet 23)

27



(Joins sheet 26)

(Joins sheet 28)

(Joins sheet 31)

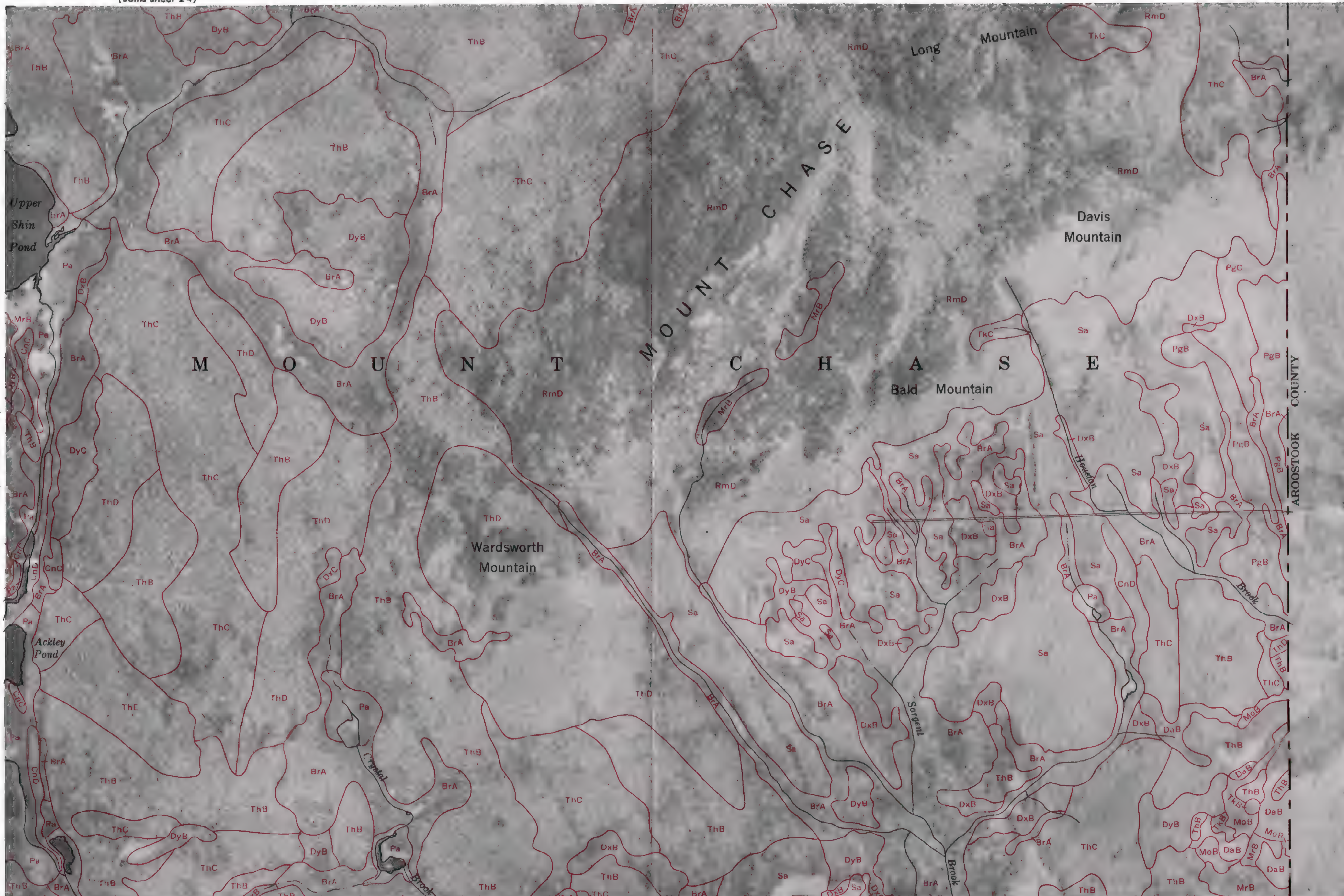
0 ½ 1 Mile Scale 1:20 000 0 5000 Feet

This map is one of a set compiled in 1962, as part of a soil survey by the Soil Conservation Service, United States Department of Agriculture, and the Maine Agricultural Experiment Station.

28

(Joins sheet 24)

(Joins sheet 27)

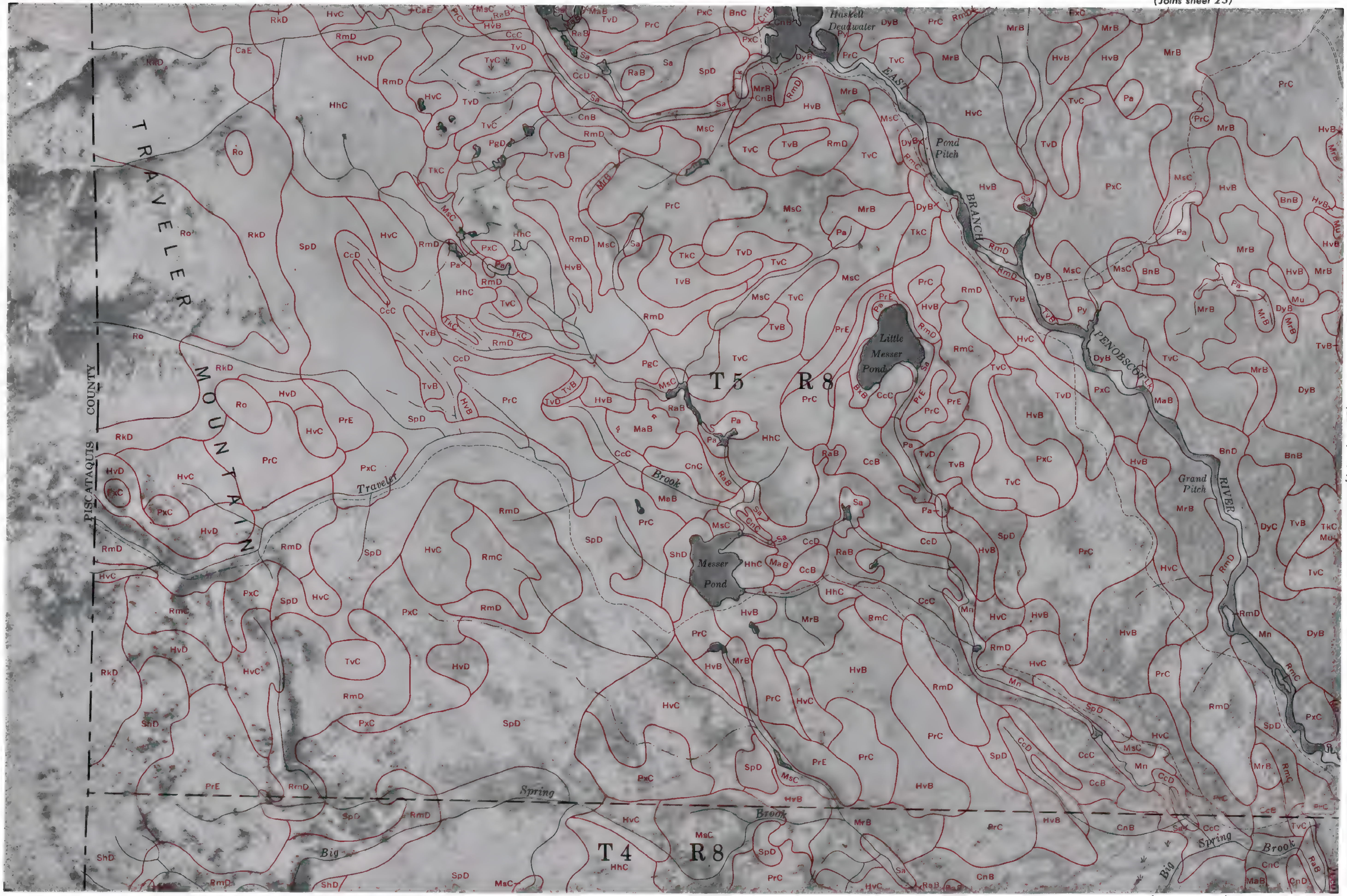


(Joins sheet 32)

0 ½ 1 Mile Scale 1:20 000 0 5000 Feet

(Joins sheet 25)

29

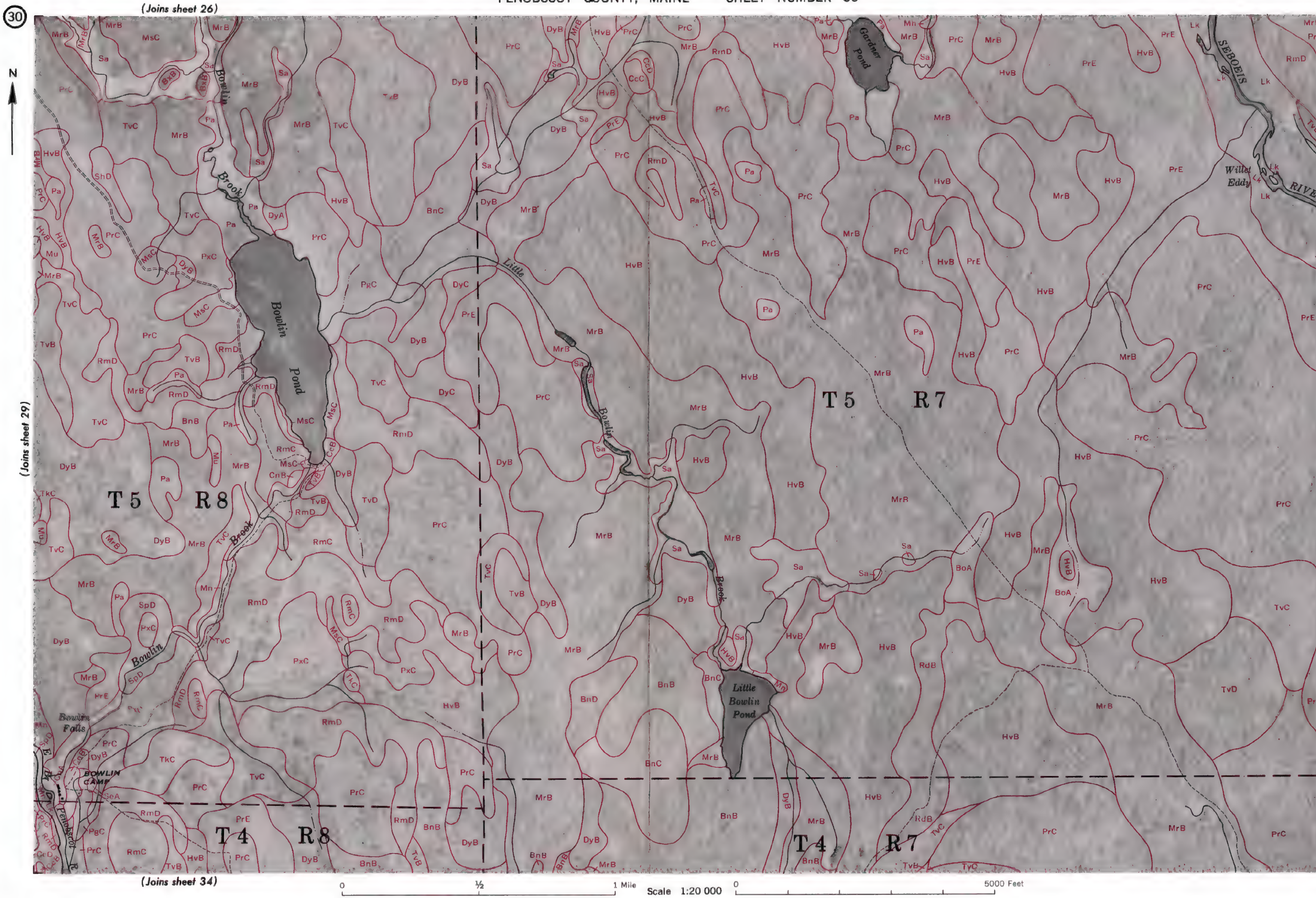


(Joins sheet 30)

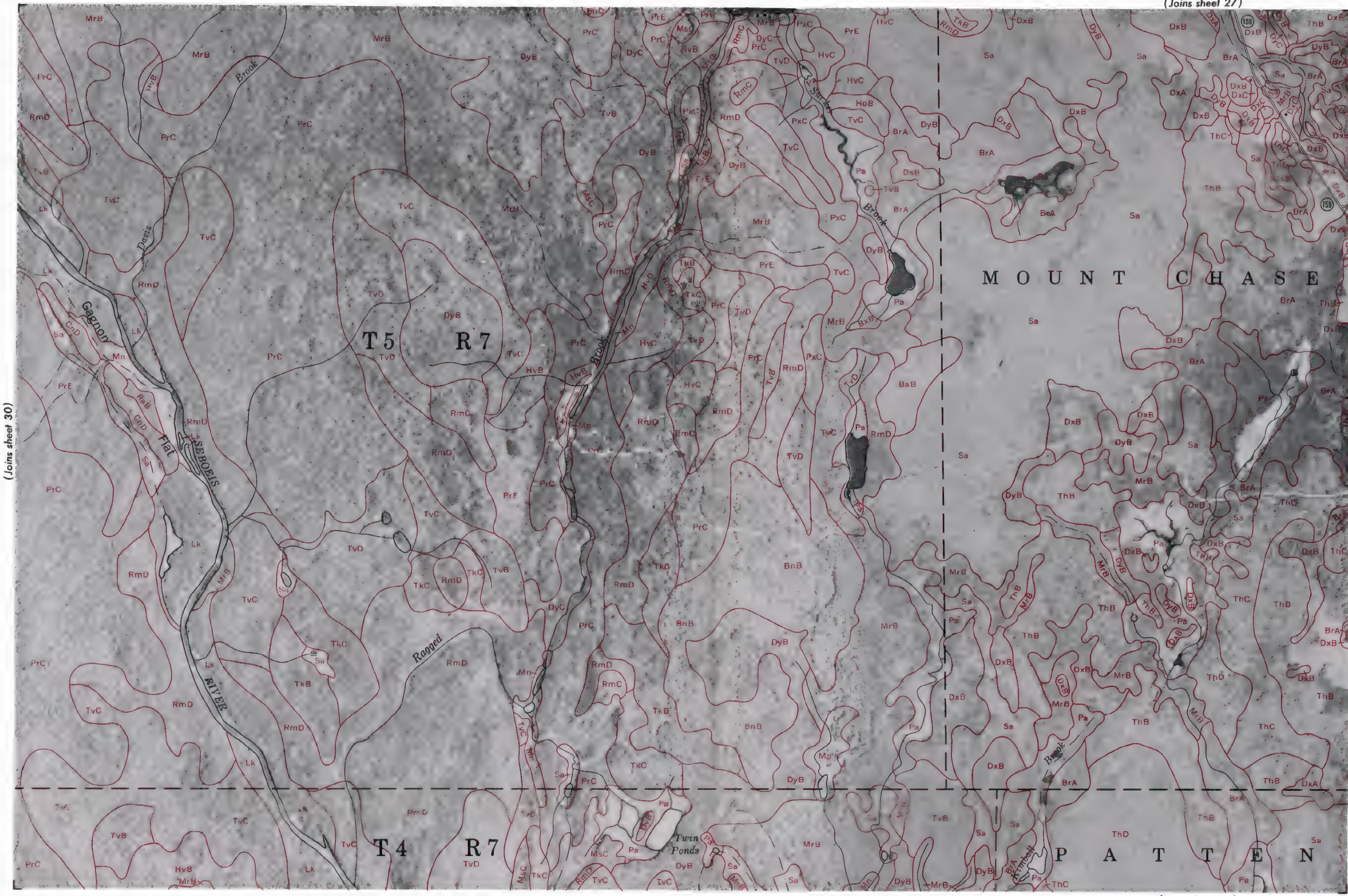
(Joins sheet 33)

0 ½ 1 Mile Scale 1:20 000 0 5000 Feet

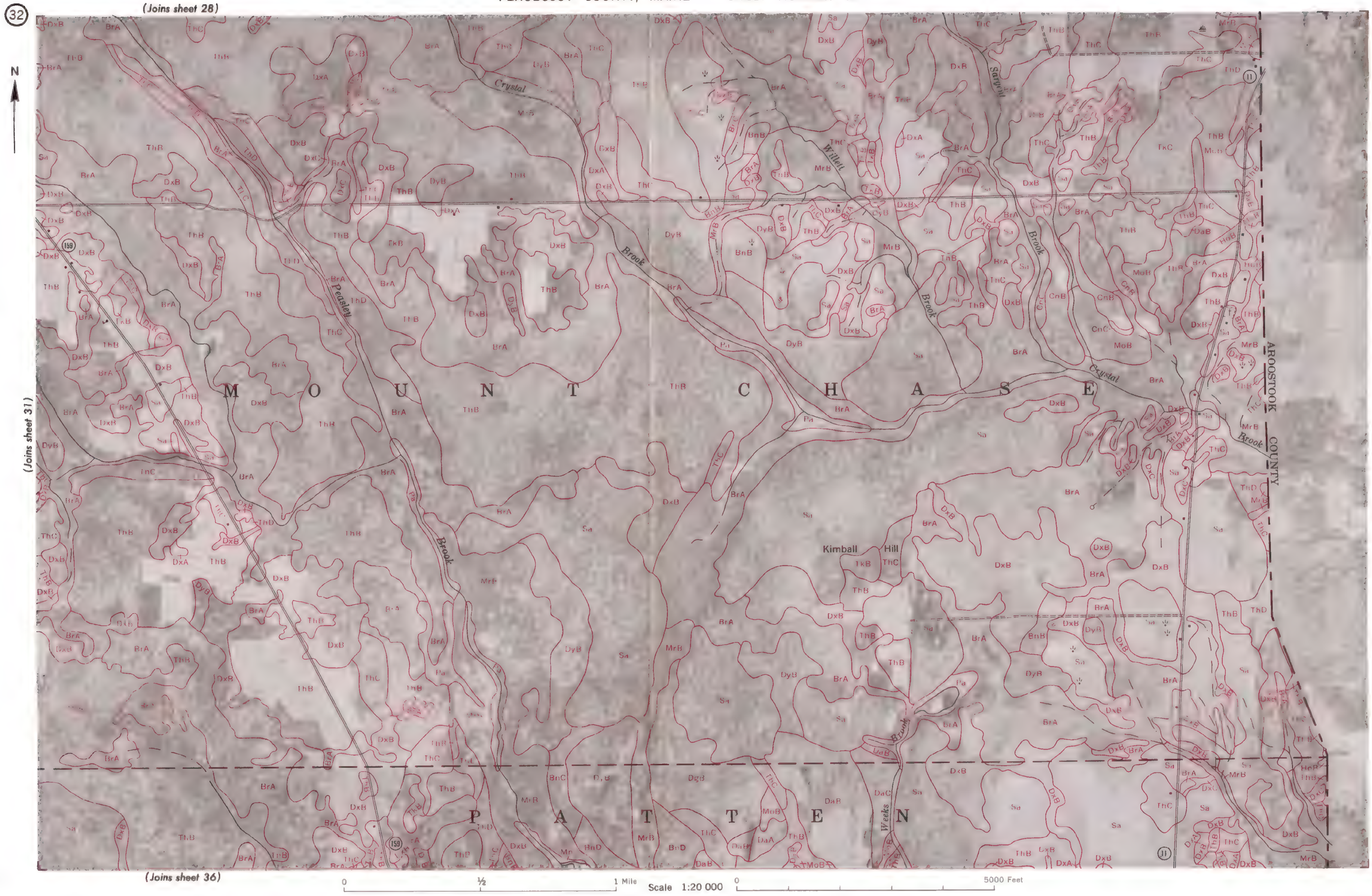
This map is one of a set compiled in 1962, as part of a soil survey by the Soil Conservation Service, United States Department of Agriculture, and the Maine Agricultural Experiment Station.


(Joins sheet 26)
(Joins sheet 29)
(Joins sheet 31)
(Joins sheet 34)
N
Bowlin Pond
Little Bowlin Pond
Gardner Pond
Bowlin Brook
Little Bowlin Brook
SEBOEIS RIVER
Willet Eddy
Bowlin Falls
BOWLIN CAMP
Penobscot
T 5 R 8
T 5 R 7
T 4 R 8
T 4 R 7
0
½
1 Mile
Scale 1:20 000
0
5000 Feet

This map is one of a set compiled in 1962, as part of a soil survey by the Soil Conservation Service, United States Department of Agriculture, and the Maine Agricultural Experiment Station.



0 ½ 1 Mile Scale 1:20 000 0 5000 Feet


32
(Joins sheet 28)
N
(Joins sheet 31)
(Joins sheet 36)
M O U N T C H A S E
P A T T E N
AROOSTOOK COUNTY
Kimball Hill
Crystal Brook
Peasley Brook
Willett Brook
Sargent Brook
Weeks Brook
0 ½ 1 Mile
Scale 1:20 000
0 5000 Feet

(Joins sheet 29)

33

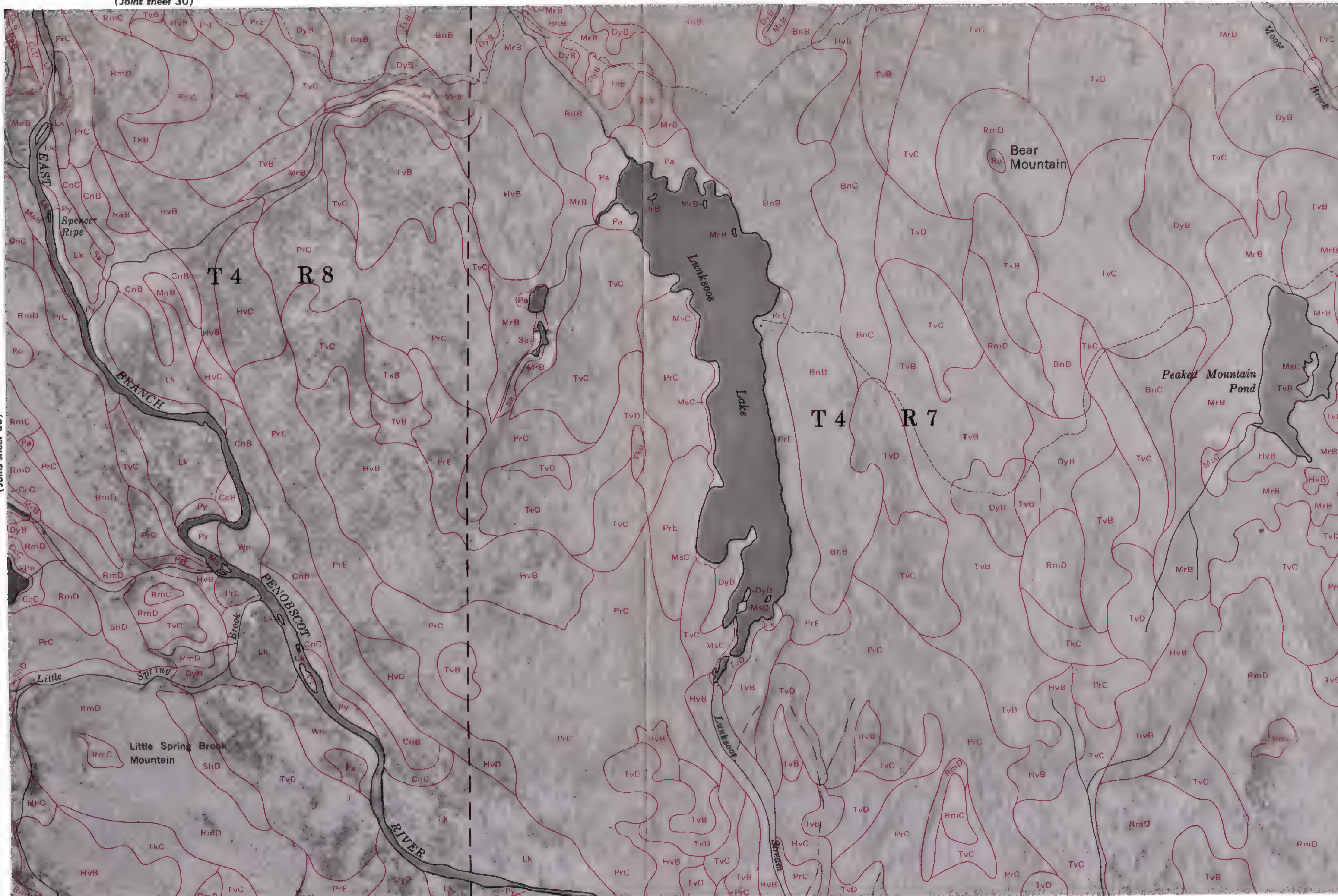
(Joins sheet 37)

0 ½ 1 Mile Scale 1:20 000 0 5000 Feet

This map is one of a set compiled in 1962, as part of a soil survey by the Soil Conservation Service, United States Department of Agriculture and the Maine Agricultural Experiment Station.

34

(Joins sheet 30)



(Joins sheet 33)

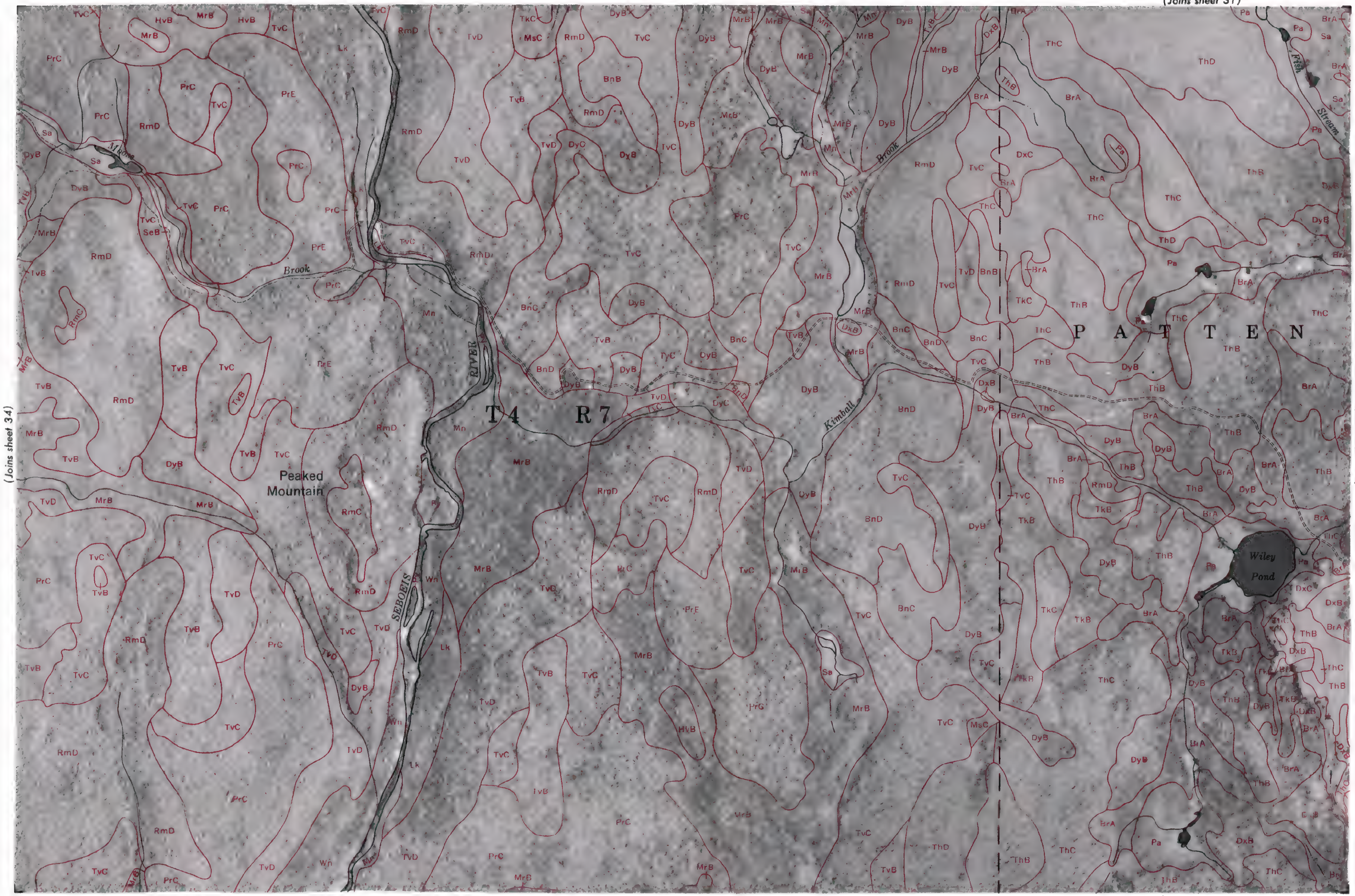
(Joins sheet 35)

(Joins sheet 38)

0 ½ 1 Mile Scale 1:20 000 0 5000 Feet

(Joins sheet 31)

35



(Joins sheet 34)

(Joins sheet 36)

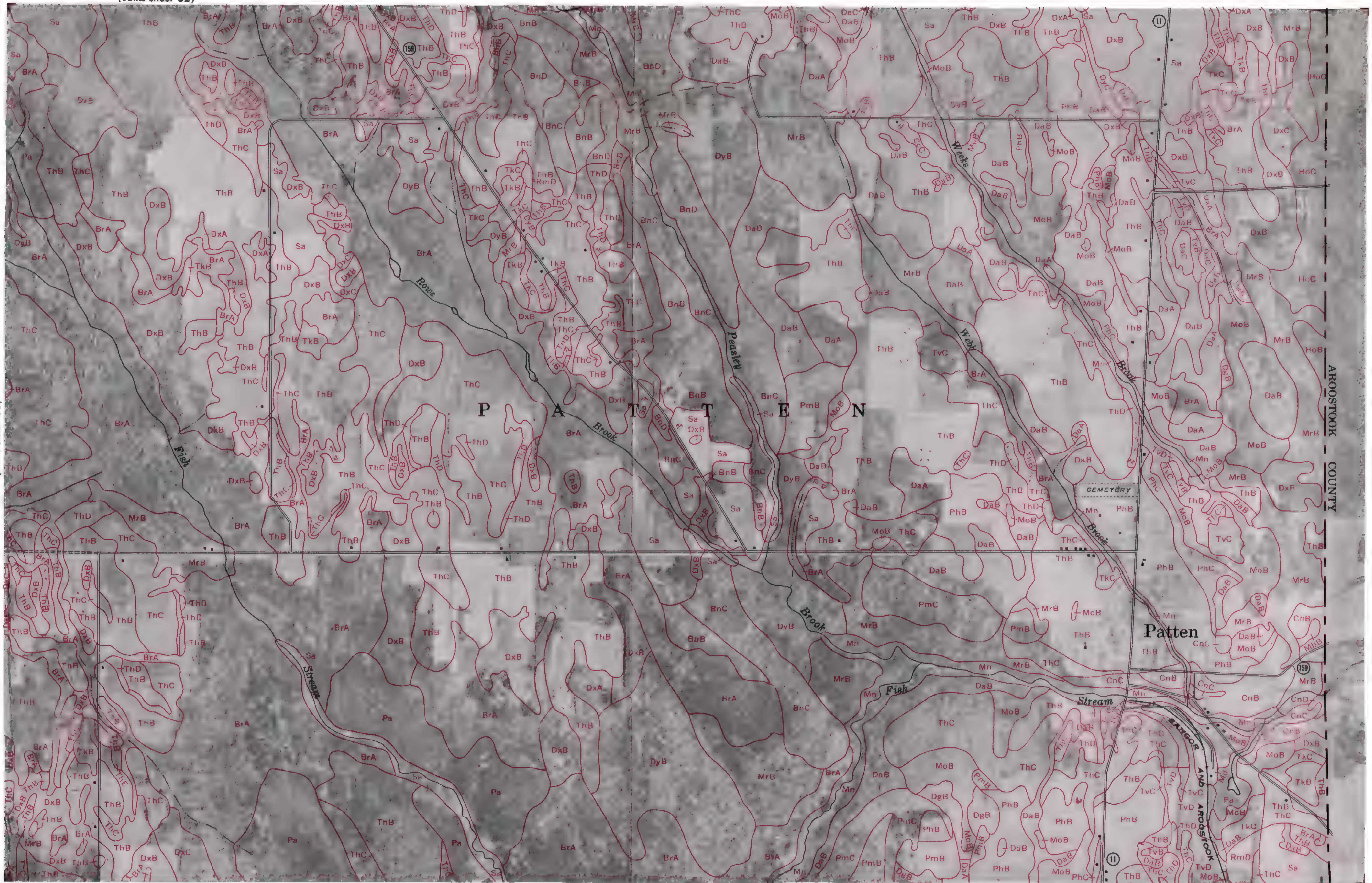
(Joins sheet 39)

0 ½ 1 Mile Scale 1:20 000 0 5000 Feet

This map is one of a set compiled in 1962, as part of a soil survey by the Soil Conservation Service, United States Department of Agriculture, and the Maine Agricultural Experiment Station.

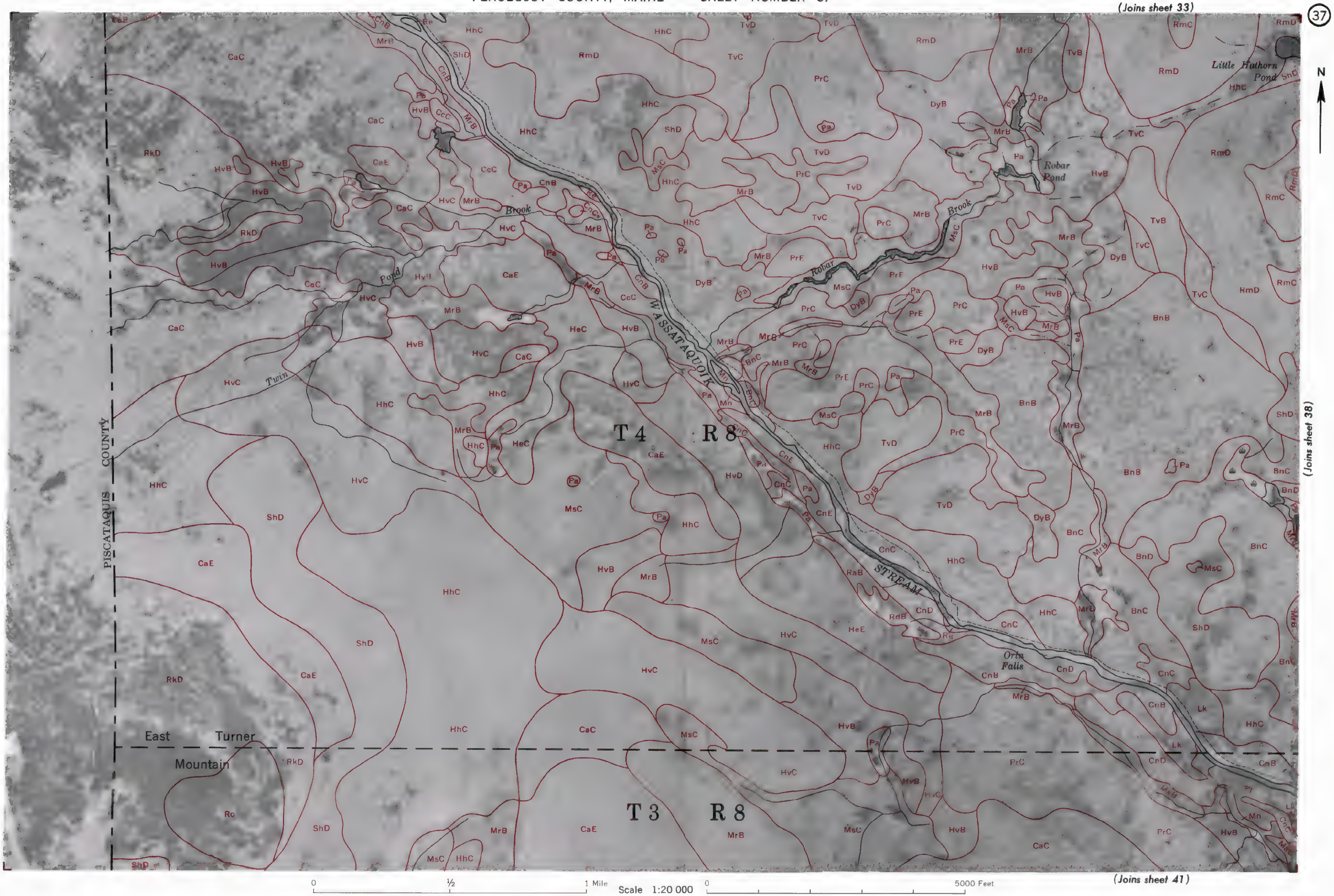
(Joins sheet 32)

(Joins sheet 35)

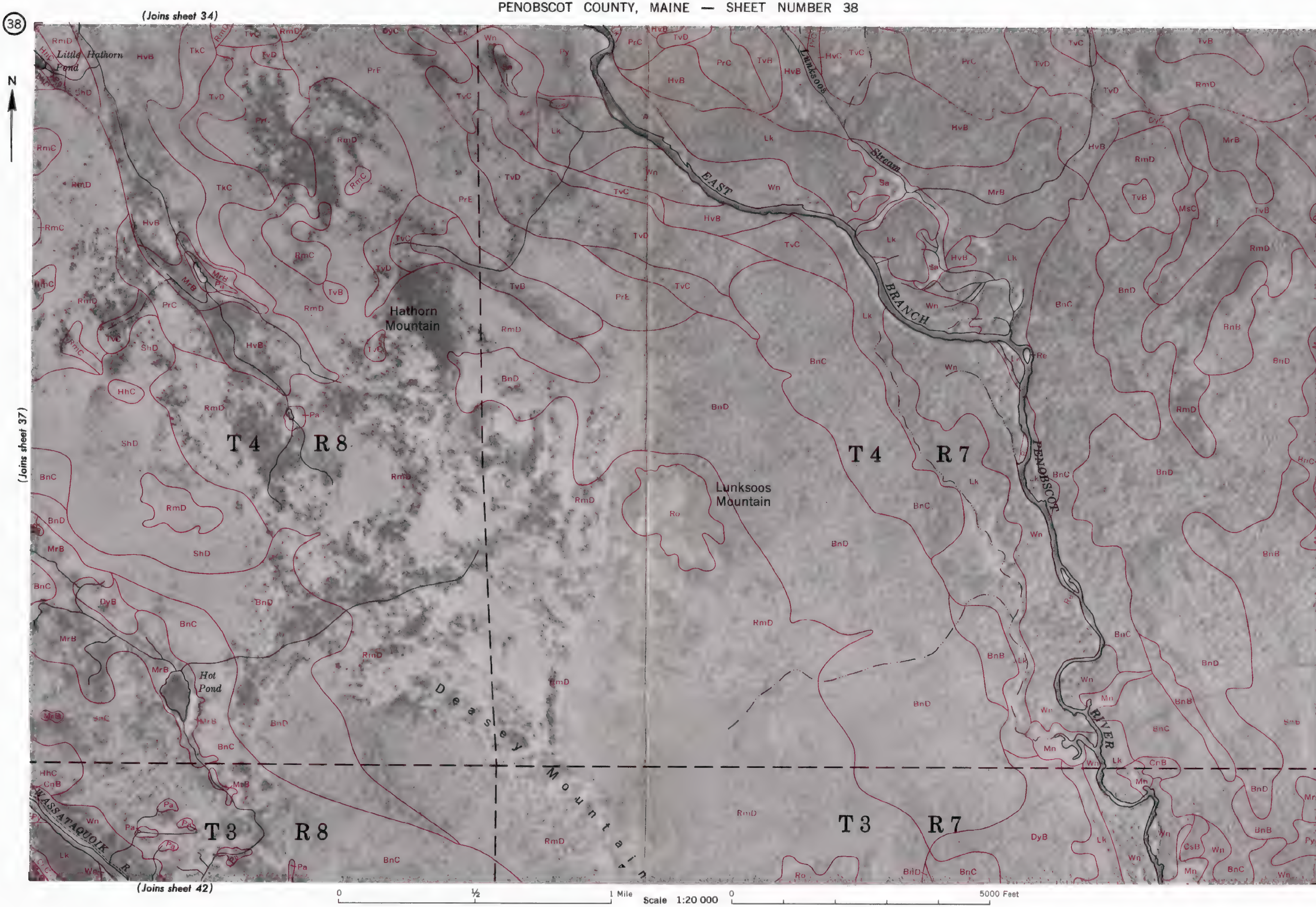


(Joins sheet 40)

0 ½ 1 Mile Scale 1:20 000 0 5000 Feet

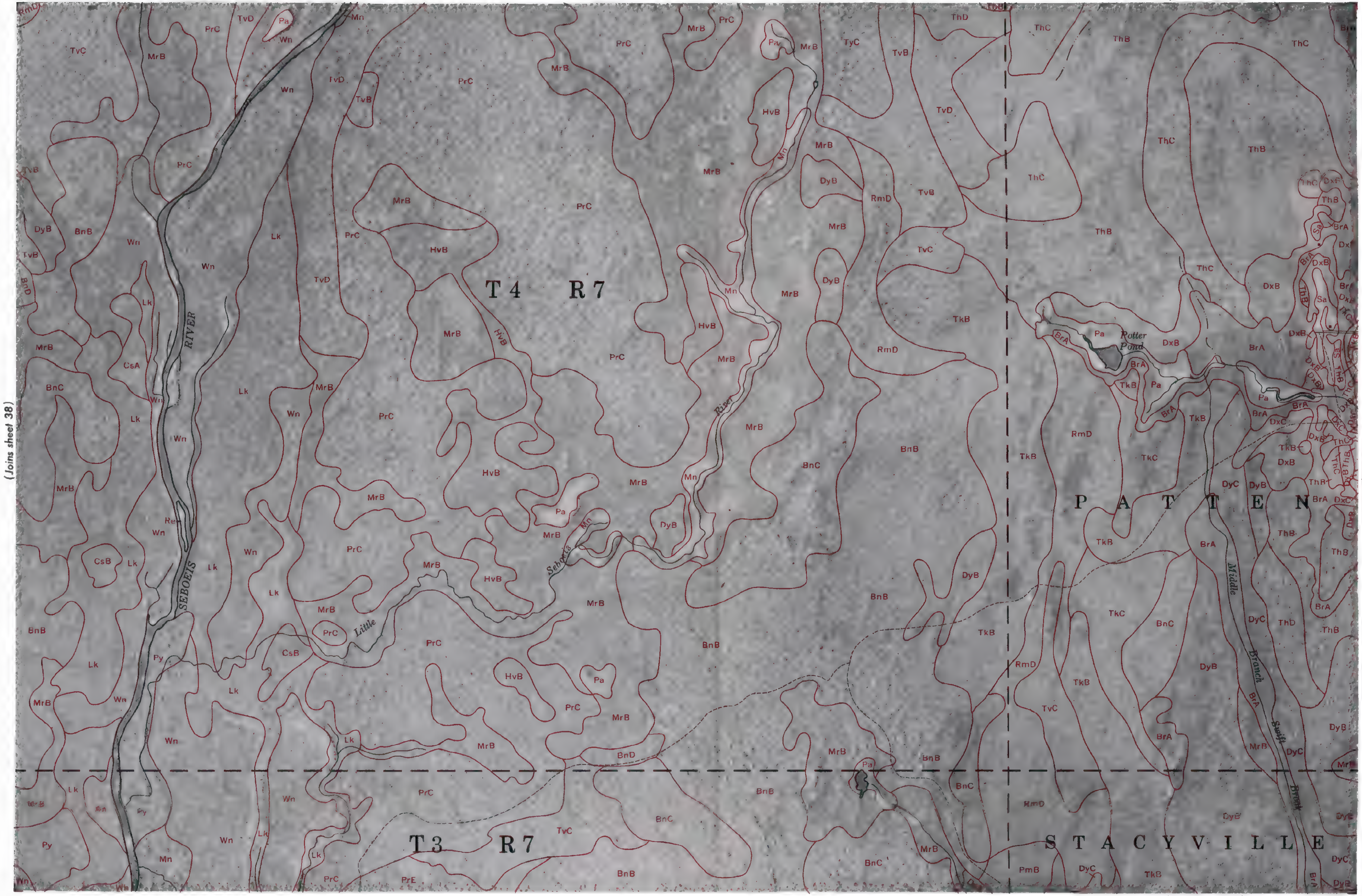


This map is one of a set compiled in 1962, as part of a soil survey by the Soil Conservation Service, United States Department of Agriculture, and the Maine Agricultural Experiment Station.


38
(Joins sheet 34)
(Joins sheet 37)
(Joins sheet 39)
(Joins sheet 42)
N
Little Hathorn Pond
Hathorn Mountain
Lunksoos Mountain
Hot Pond
Deasey Mountain
EAST BRANCH
PENOBSCOT RIVER
Lunksoos Stream
WASSATAQUOIK R
T 4 R 8
T 4 R 7
T 3 R 8
T 3 R 7
0 ½ 1 Mile
Scale 1:20 000
0 5000 Feet

(Joins sheet 35)

39



(Joins sheet 38)

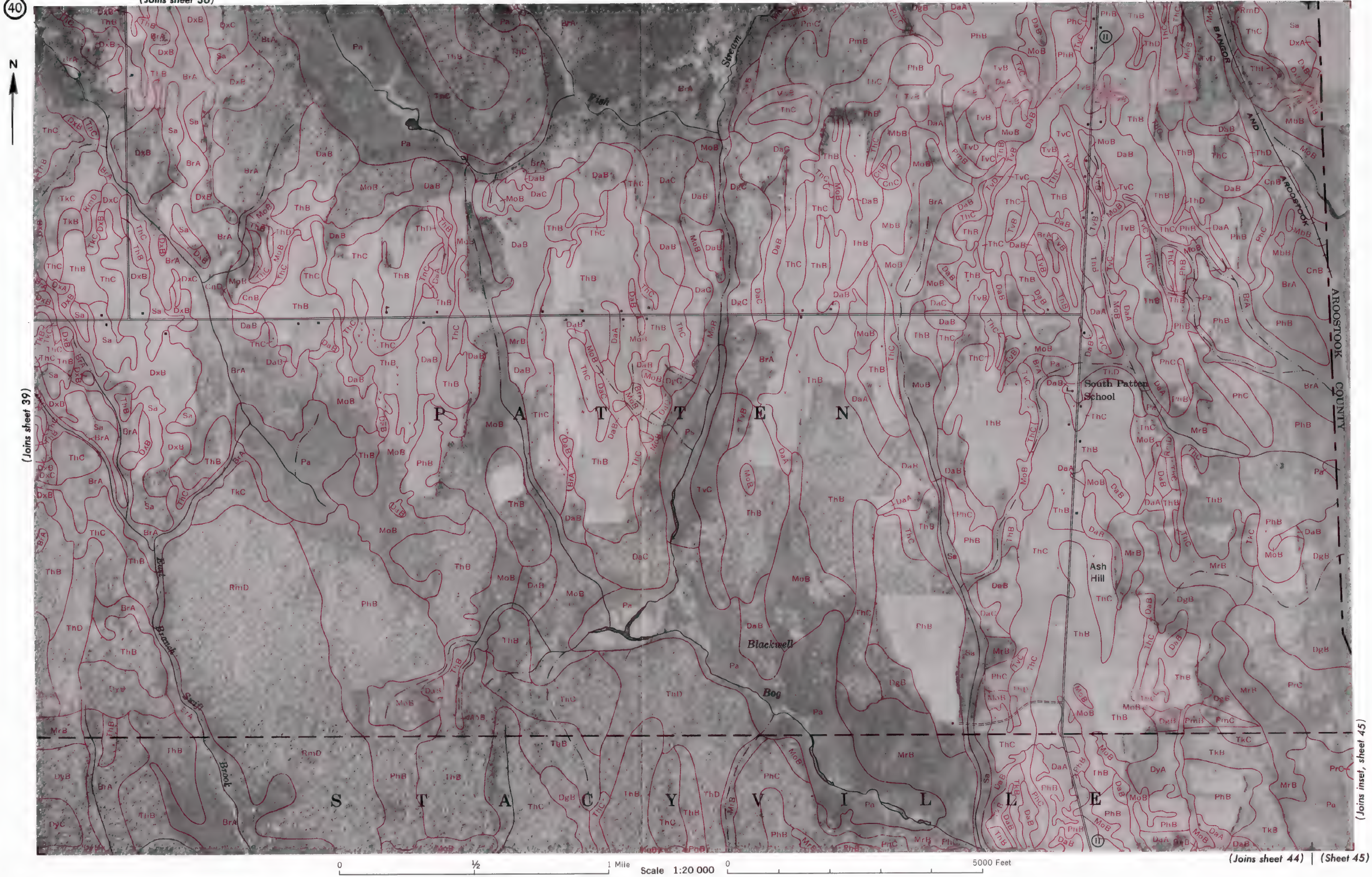
(Joins sheet 40)

(Joins sheet 43)

0 ½ 1 Mile Scale 1:20 000 0 5000 Feet

This map is one of a set compiled in 1962, as part of a soil survey by the Soil Conservation Service, United States Department of Agriculture, and the Maine Agricultural Experiment Station.

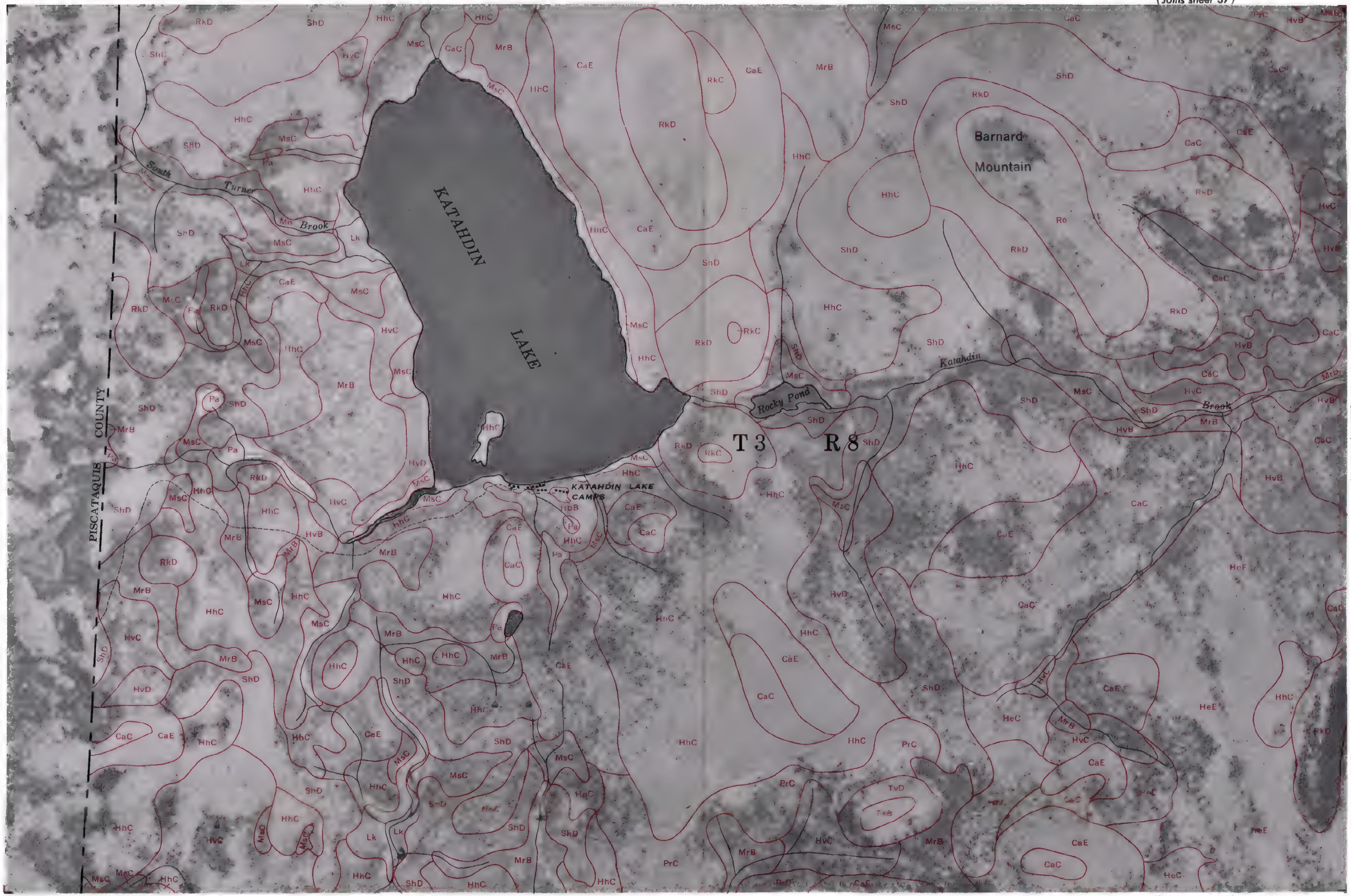
(Joins sheet 36)



(Joins sheet 44) | (Sheet 45)

41

(Joins sheet 37)

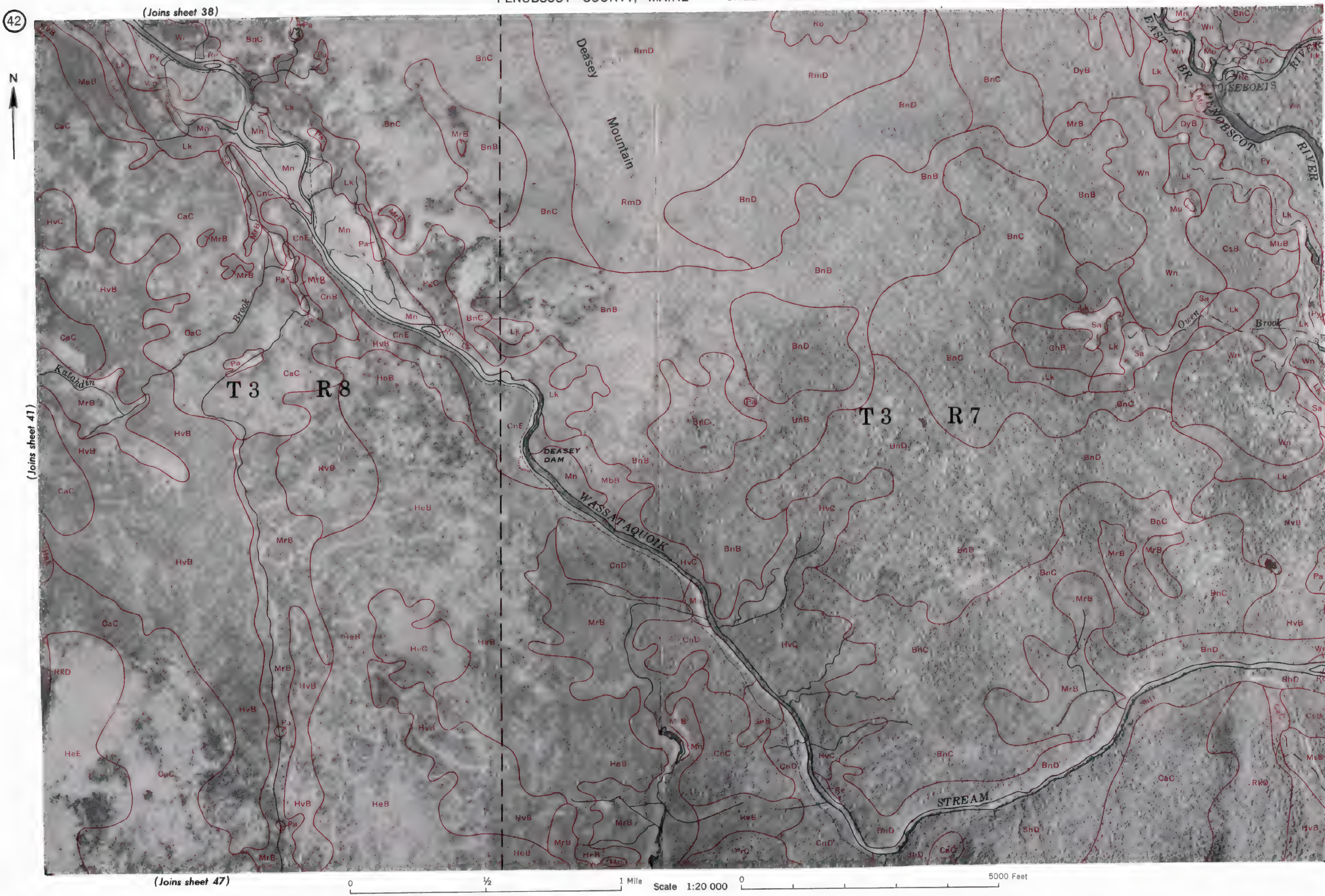


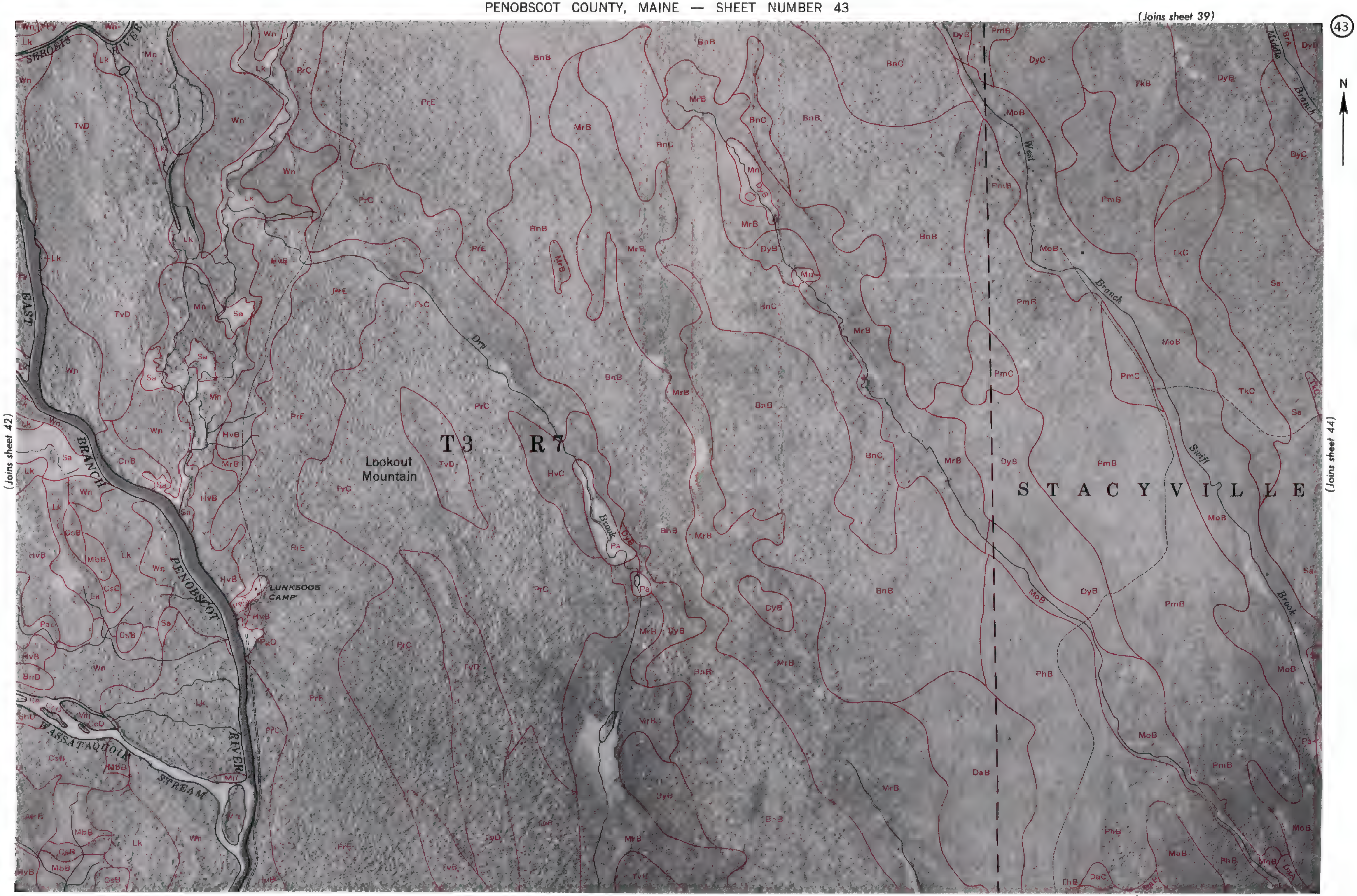
(Joins sheet 42)

(Joins sheet 46)

0 ½ 1 Mile Scale 1:20 000 0 5000 Feet

This map is one of a set compiled in 1962, as part of a soil survey by the Soil Conservation Service, United States Department of Agriculture, and the Maine Agricultural Experiment Station.


42
(Joins sheet 38)
(Joins sheet 41)
(Joins sheet 43)
(Joins sheet 47)
N
T 3 R 8
T 3 R 7
Deasey Mountain
DEASEY DAM
WASSATAQUOIK STREAM
EAST BR PENOBSCOT RIVER
SEBOEIS
Katahdin Brook
Owen Brook
Scale 1:20 000
0 ½ 1 Mile
0 5000 Feet



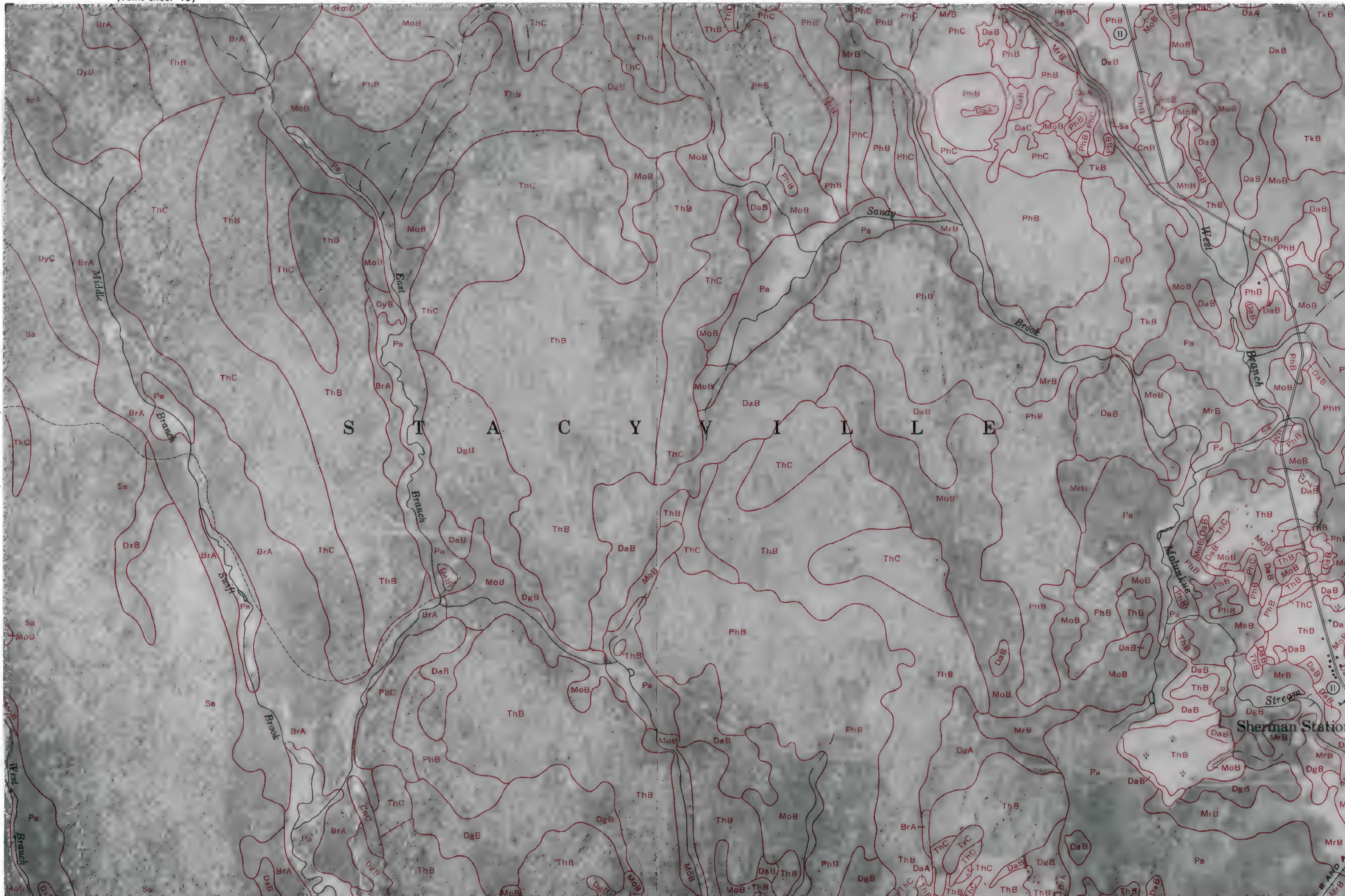
0 ½ 1 Mile Scale 1:20 000 0 5000 Feet

This map is one of a set compiled in 1962, as part of a soil survey by the Soil Conservation Service, United States Department of Agriculture, and the Maine Agricultural Experiment Station.

44

(Joins sheet 40)

(Joins sheet 43)



(Joins sheet 45)

(Joins sheet 49)

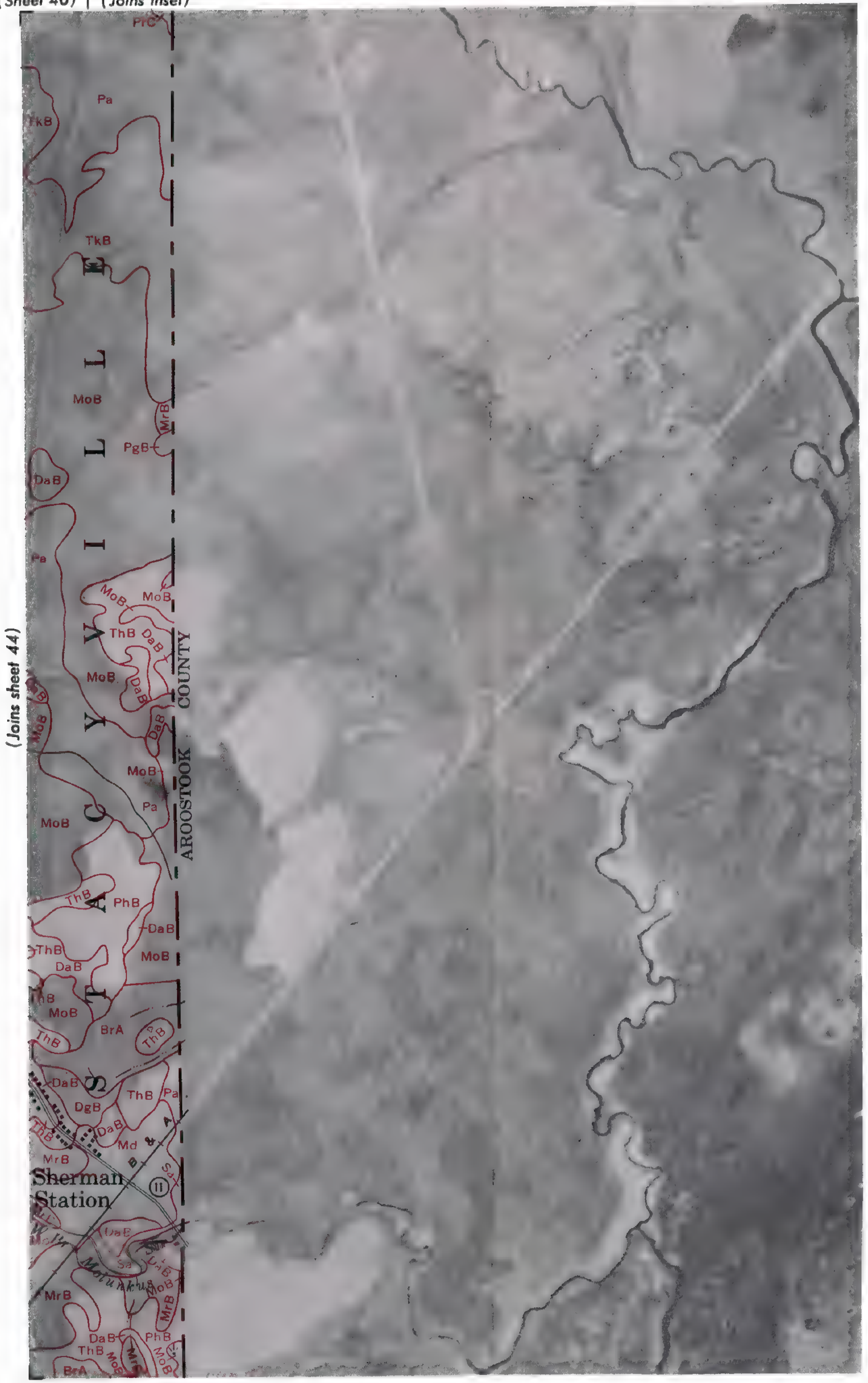
0 ½ 1 Mile Scale 1:20 000 0 5000 Feet

PENOBSCOT COUNTY, MAINE — SHEET NUMBER 45

(45)

(Sheet 40) | (Joins inset)

(Joins sheet 44)



(Joins inset, sheet 58)

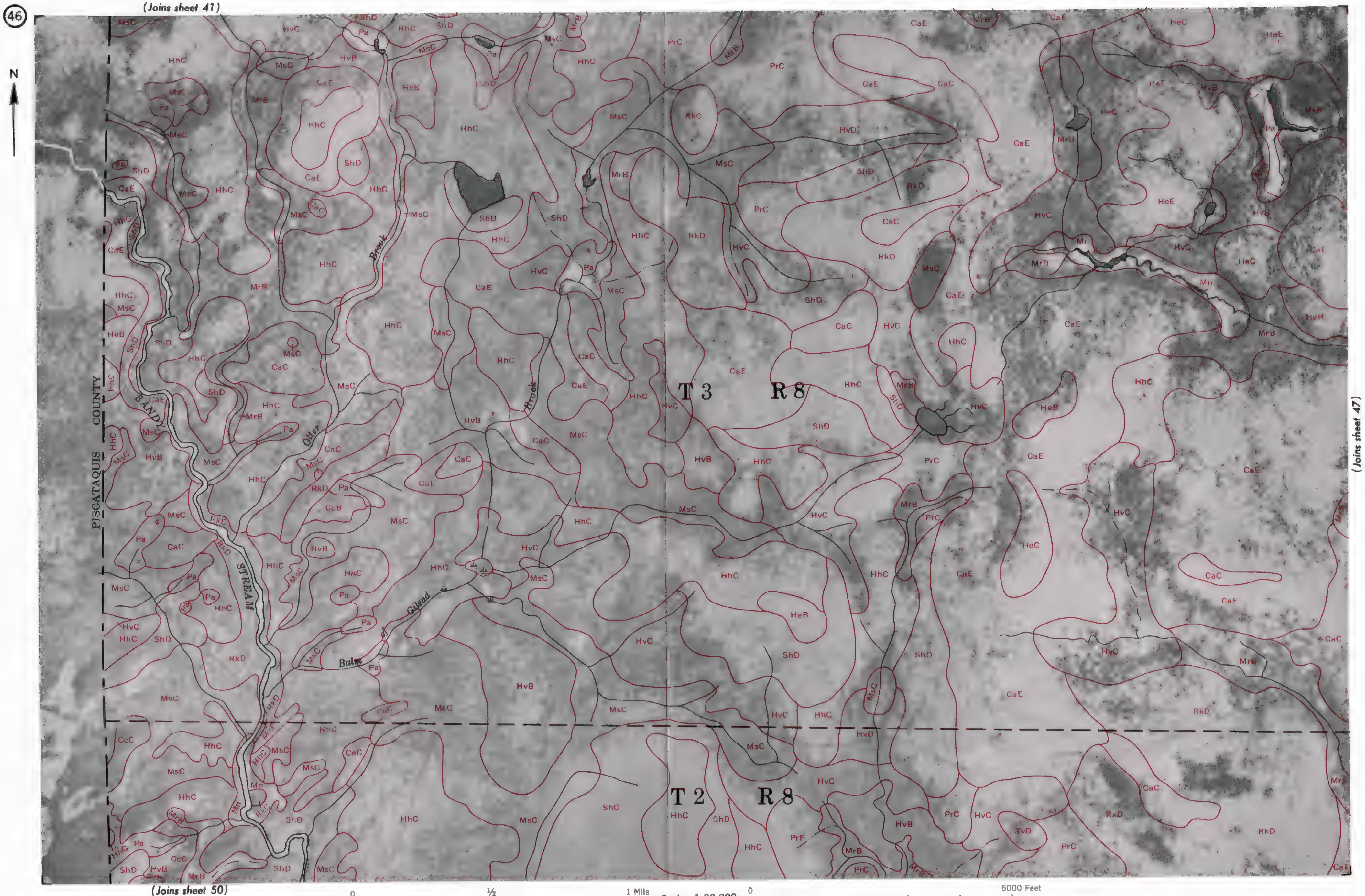
(Joins sheet 40)

(Joins upper left)

0 ½ 1 Mile Scale 1:20 000 0 5000 Feet

This map is one of a set compiled in 1962, as part of a soil survey by the Soil Conservation Service, United States Department of Agriculture, and the Maine Agricultural Experiment Station.

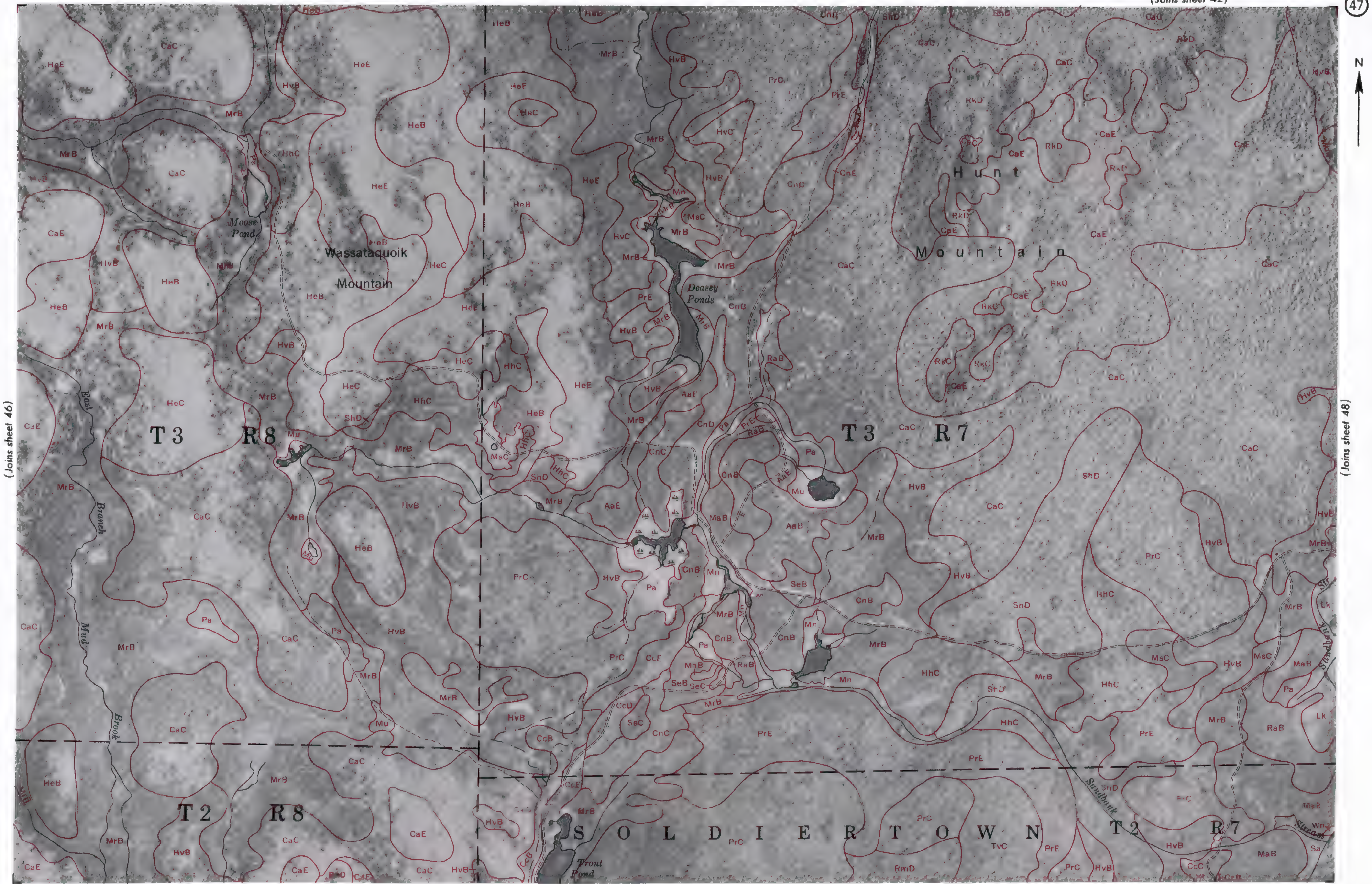
46



0 ½ 1 Mile Scale 1:20 000 0 5000 Feet

(Joins sheet 42)

(Joins sheet 46)



(Joins sheet 48)

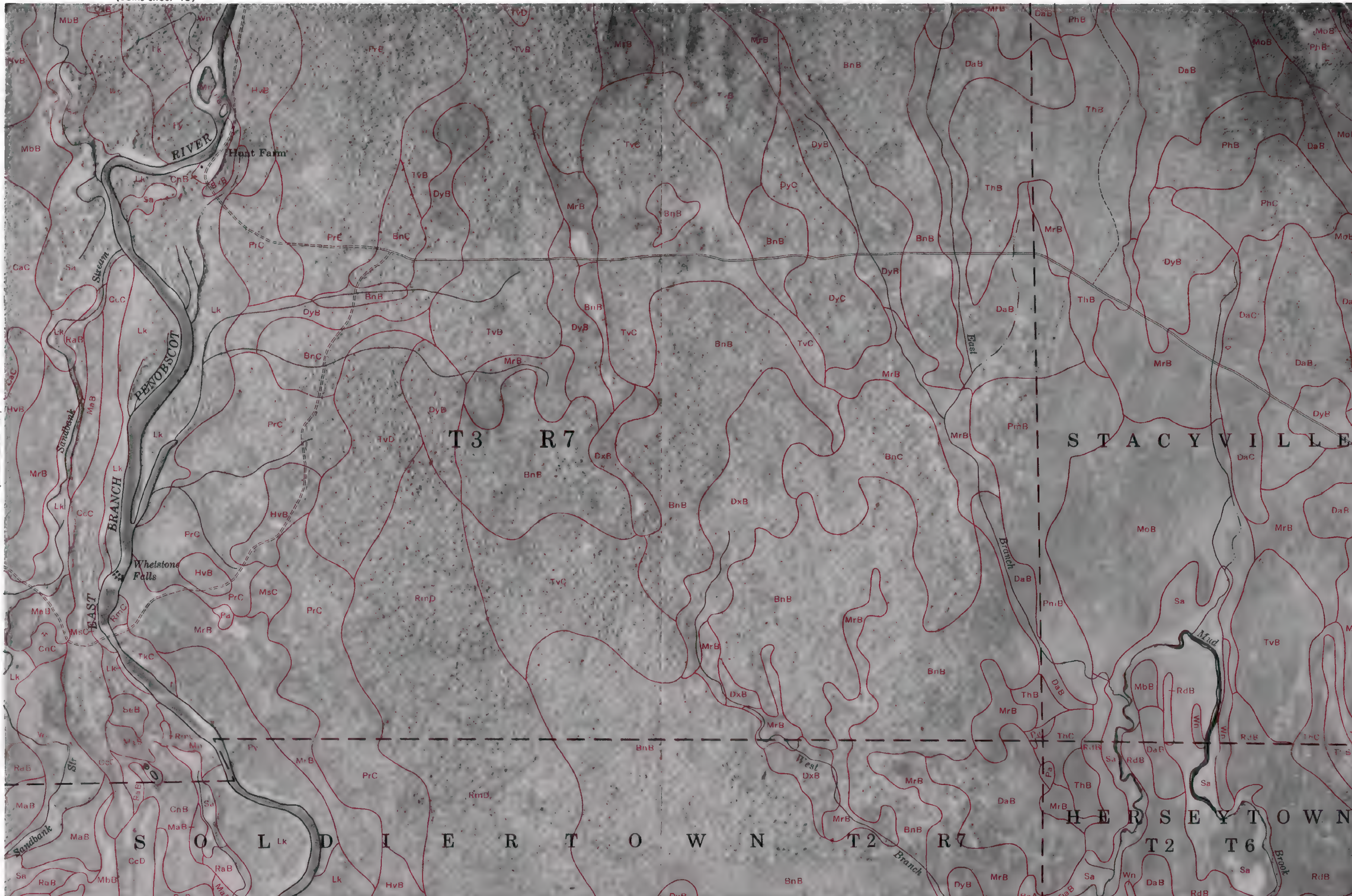
(Joins sheet 51)

0 ½ 1 Mile Scale 1:20 000 0 5000 Feet

This map is one of a set compiled in 1962, as part of a soil survey by the Soil Conservation Service, United States Department of Agriculture, and the Maine Agricultural Experiment Station.

(Joins sheet 43)

(Joins sheet 47)



(Joins sheet 49)

(Joins sheet 52)

0 ½ 1 Mile Scale 1:20 000 0 5000 Feet

(49)

(Joins sheet 44)

(Joins sheet 48)

(Joins inset, sheet 58)

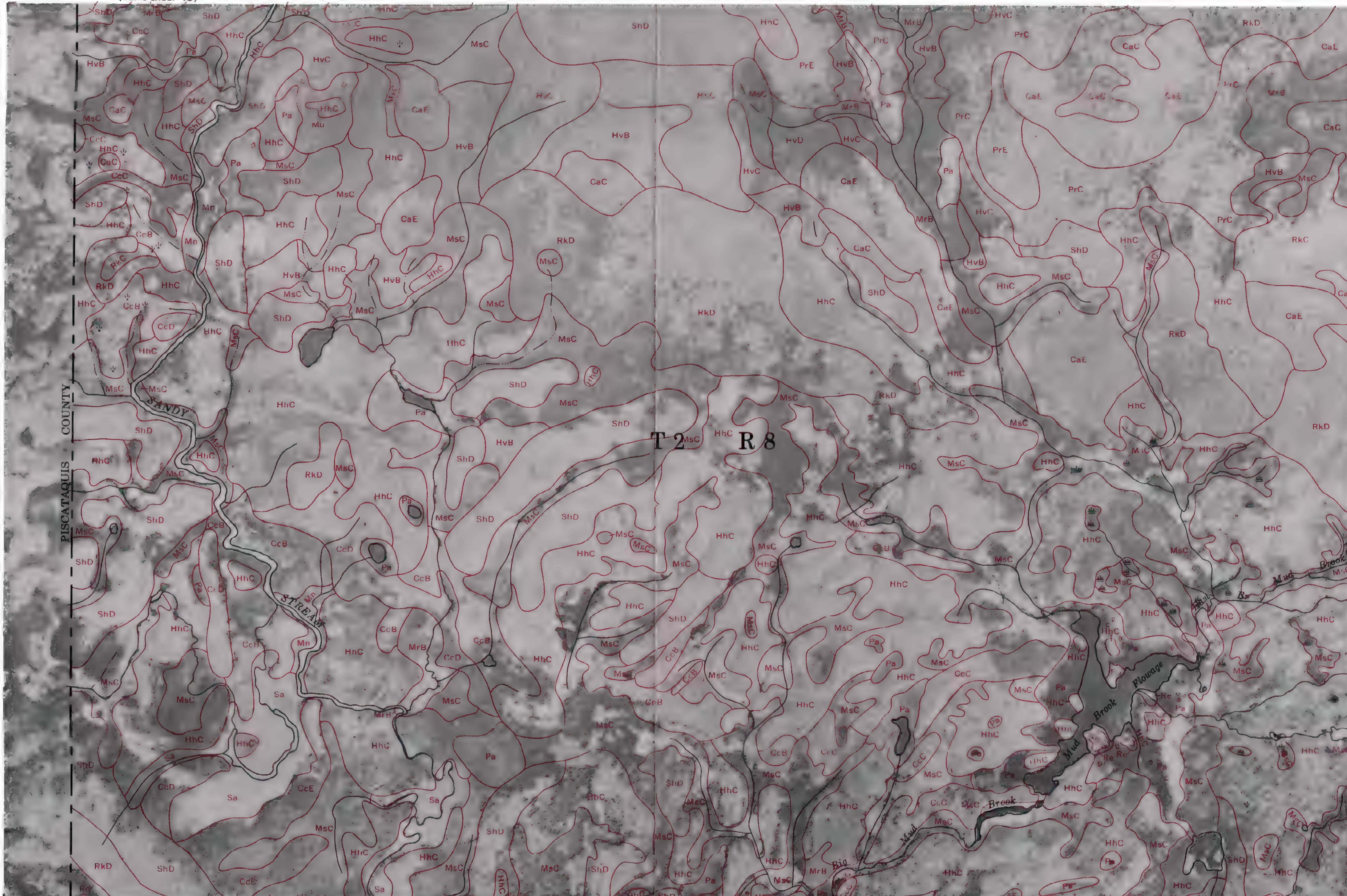
(Joins sheet 53)

0 ½ 1 Mile Scale 1:20 000 0 5000 Feet

This map is one of a set compiled in 1962, as part of a soil survey by the Soil Conservation Service, United States Department of Agriculture, and the Maine Agricultural Experiment Station.

(Joins sheet 46)

N



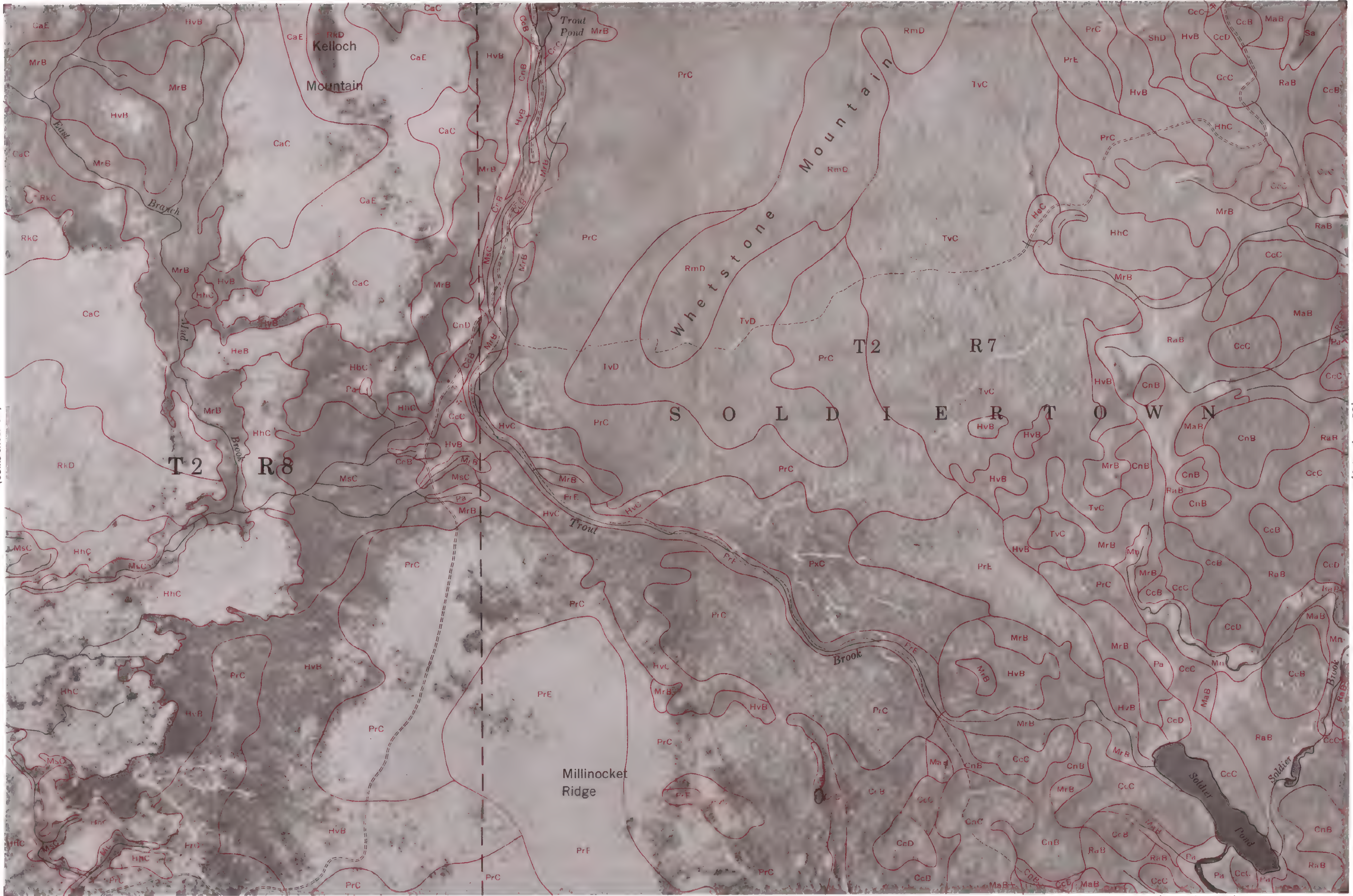
(Joins sheet 51)

(Joins sheet 54)

0 ½ 1 Mile Scale 1:20 000 0 5000 Feet

(Joins sheet 47)

(Joins sheet 50)



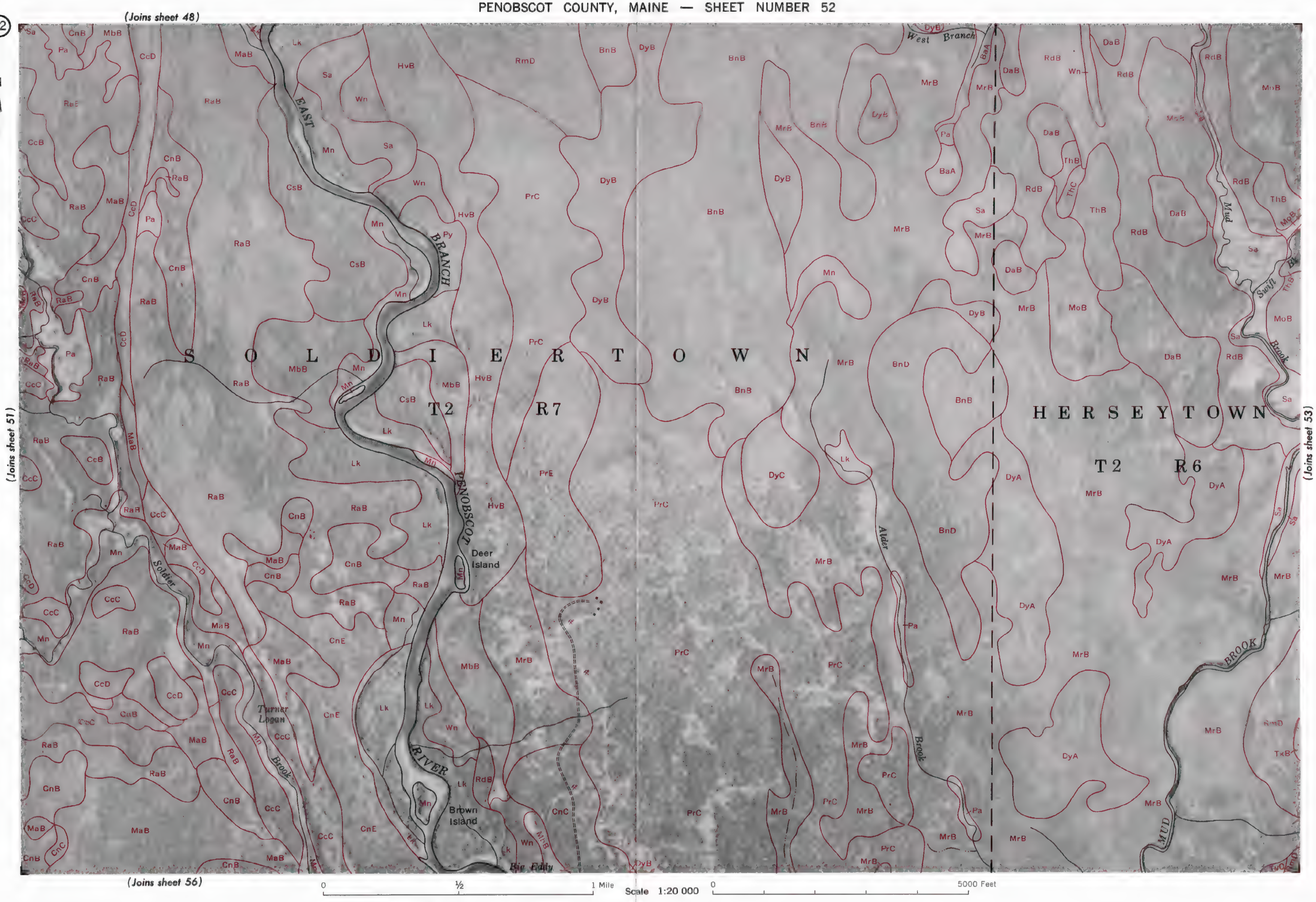
(Joins sheet 52)

(Joins sheet 55)

0 ½ 1 Mile Scale 1:20 000 0 5000 Feet

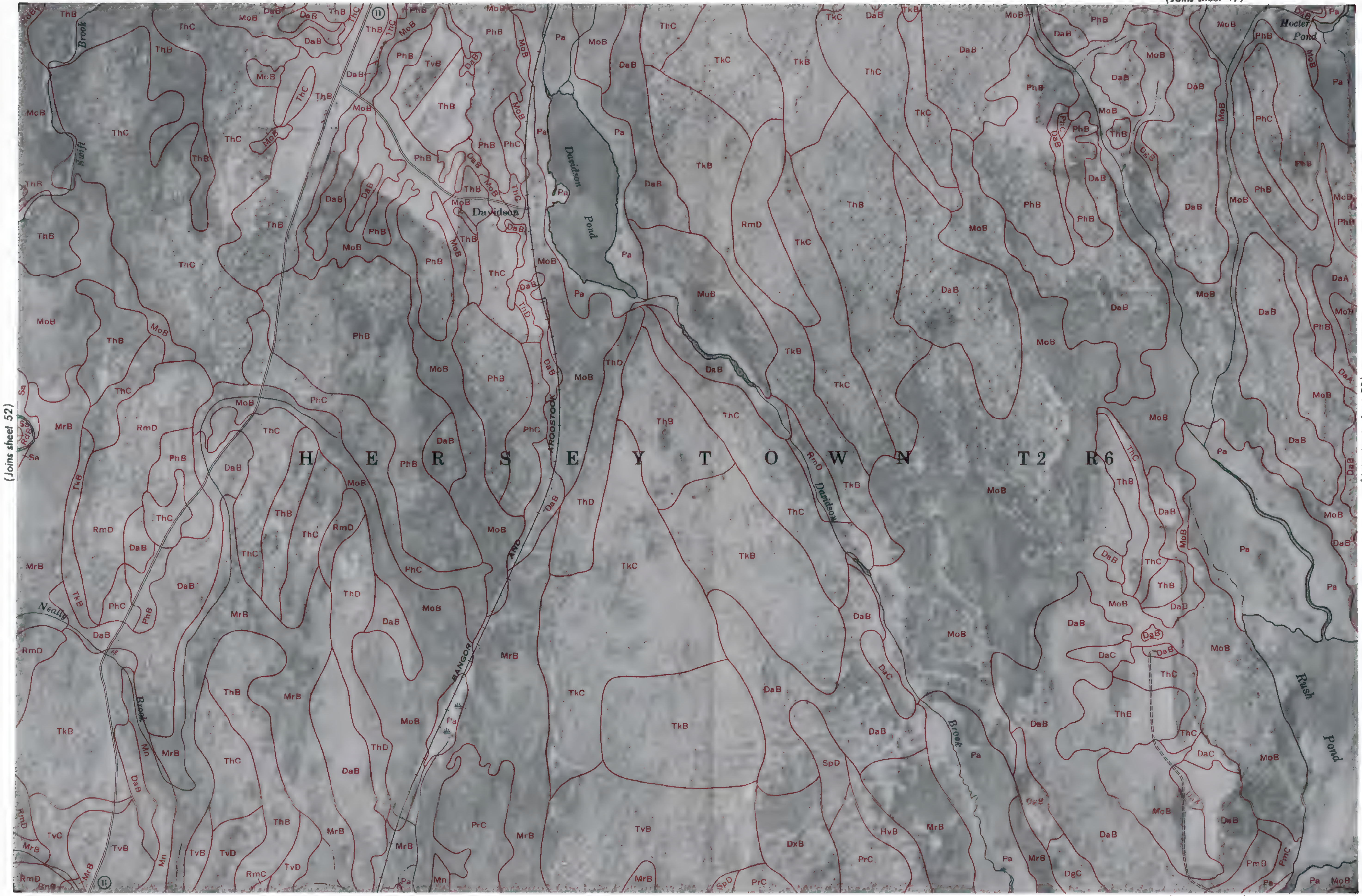
This map is one of a set compiled in 1962, as part of a soil survey by the Soil Conservation Service, United States Department of Agriculture, and the Maine Agricultural Experiment Station.

52


(Joins sheet 48)
N
(Joins sheet 51)
(Joins sheet 53)
(Joins sheet 56)
S O L D I E R T O W N
T2 R7
H E R S E Y T O W N
T2 R6
EAST BRANCH
PENOBSCOT RIVER
West Branch
Deer Island
Brown Island
Big Eddy
Soldier Brook
Turner Logan Brook
Alder Brook
Mud Brook
Swift Brook
MUD BROOK
0 ½ 1 Mile
Scale 1:20 000
0 5000 Feet

(Joins sheet 49)

53



(Joins sheet 52)

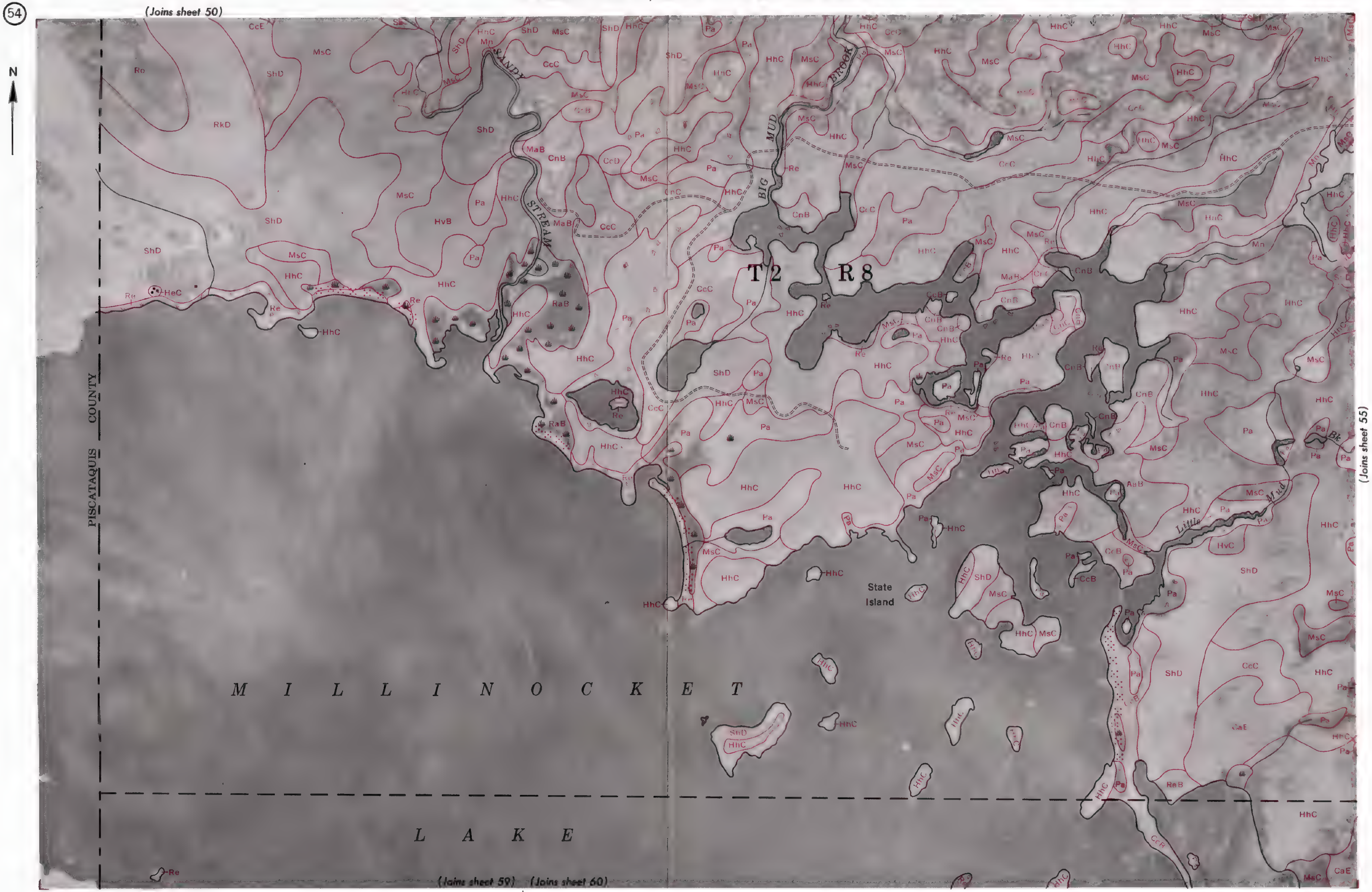
(Joins inset, sheet 58)

(Joins sheet 57)

0 ½ 1 Mile Scale 1:20 000 0 5000 Feet

This map is one of a set compiled in 1962, as part of a soil survey by the Soil Conservation Service, United States Department of Agriculture, and the Maine Agricultural Experiment Station.

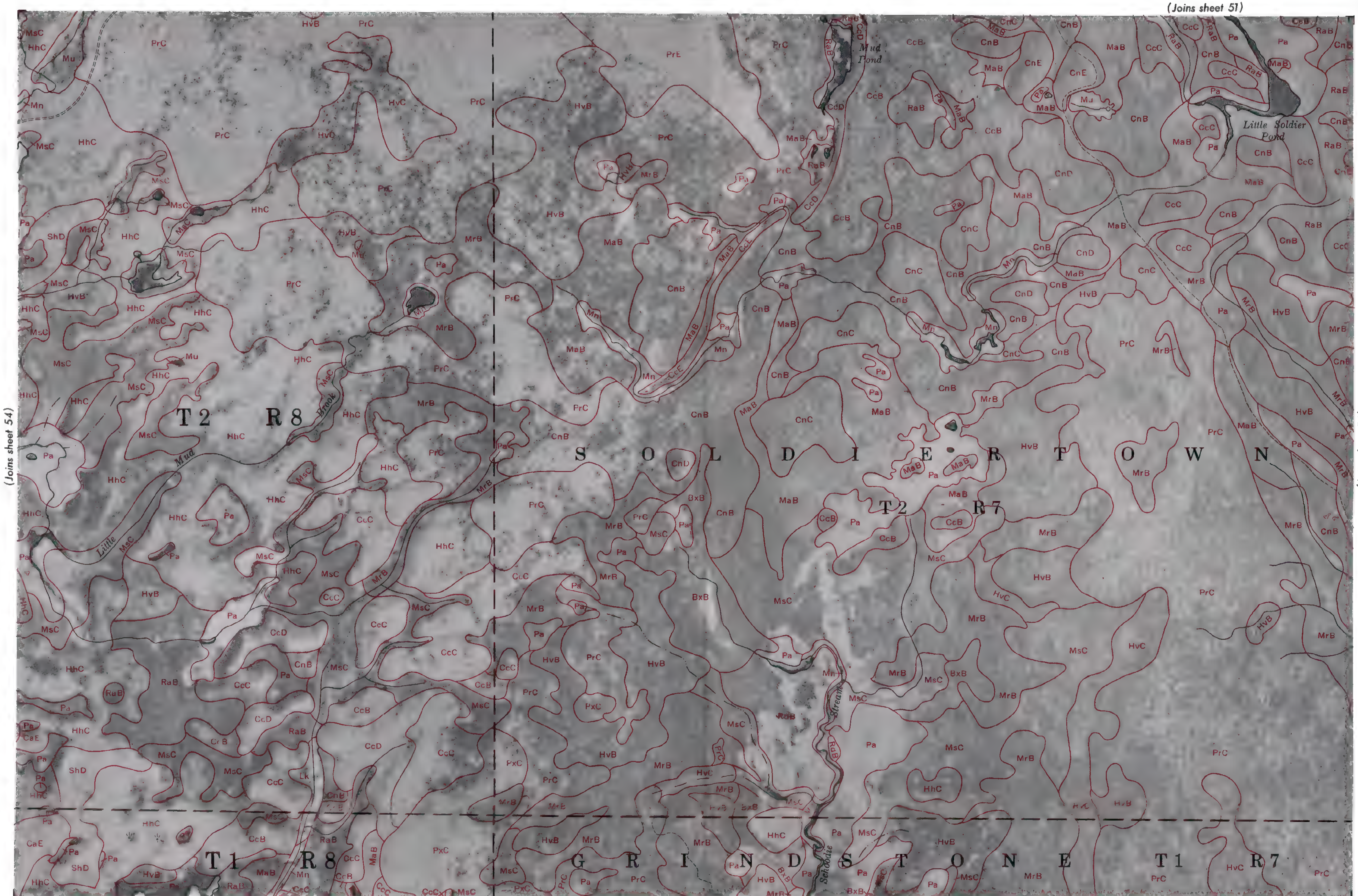
54



0 ½ 1 Mile Scale 1:20 000 0 5000 Feet

(Joins sheet 51)

(Joins sheet 54)



(Joins sheet 56)

(Joins sheet 60) | (Joins sheet 61)

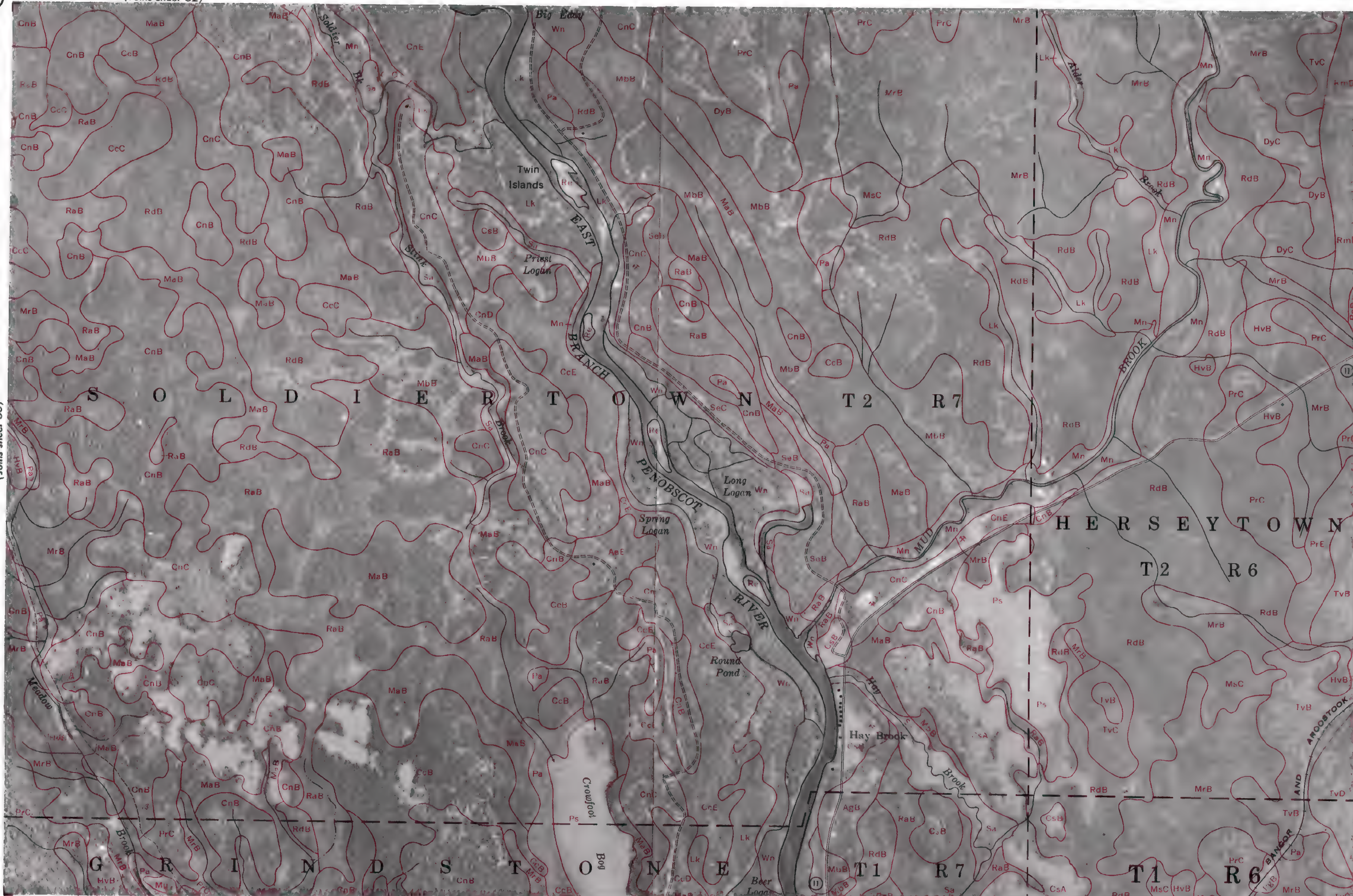
0 ½ 1 Mile Scale 1:20 000 0 5000 Feet

This map is one of a set compiled in 1962, as part of a soil survey by the Soil Conservation Service, United States Department of Agriculture, and the Maine Agricultural Experiment Station.

(Joins sheet 52)

(Joins sheet 55)

(Joins sheet 57)



(Joins sheet 61) | (Joins sheet 62)

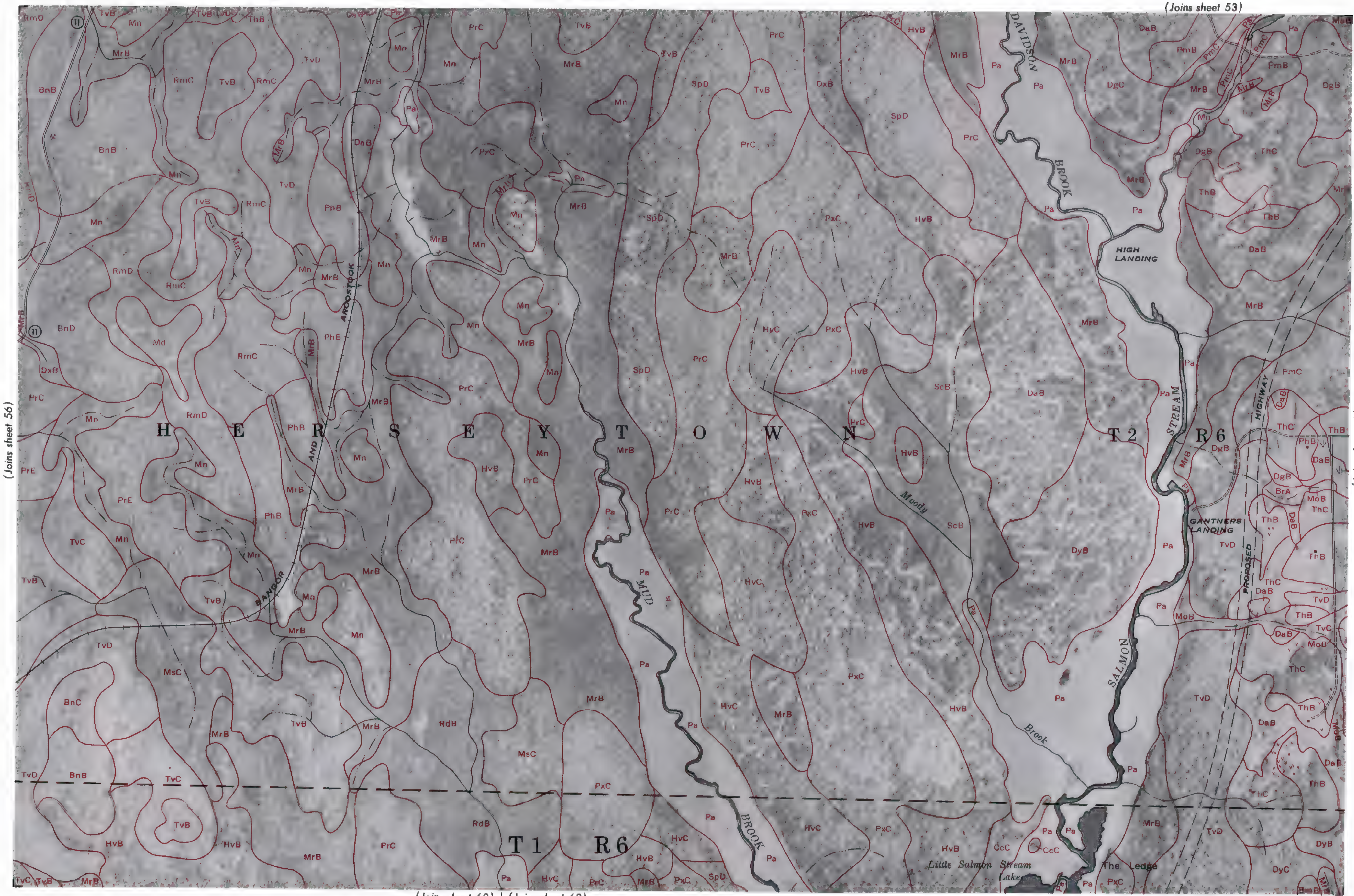
Scale 1:20 000

0 ½ 1 Mile

0 5000 Feet

(Joins sheet 53)

57



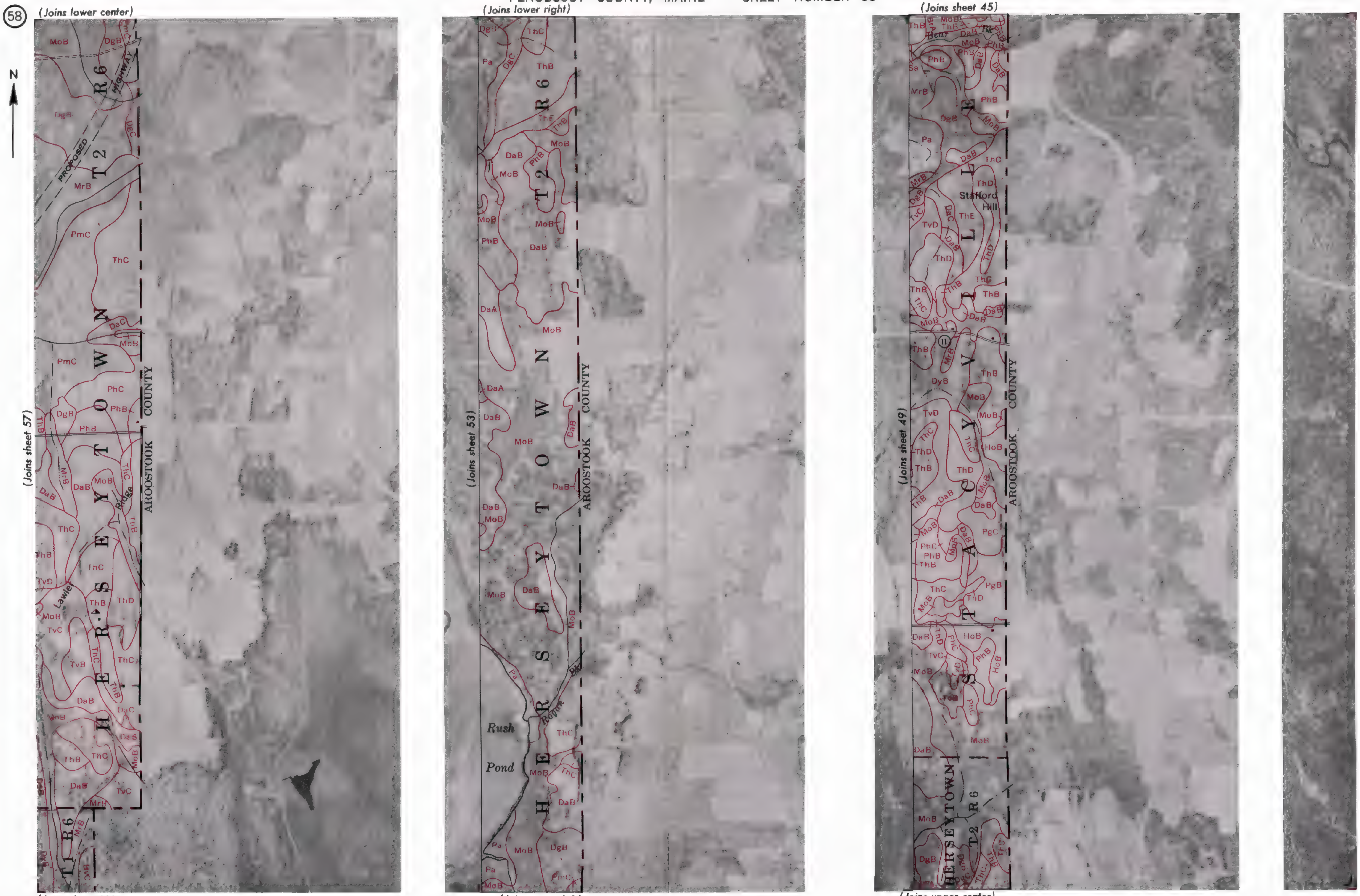
(Joins sheet 56)

(Joins sheet 58)

(Joins sheet 62) | (Joins sheet 63)

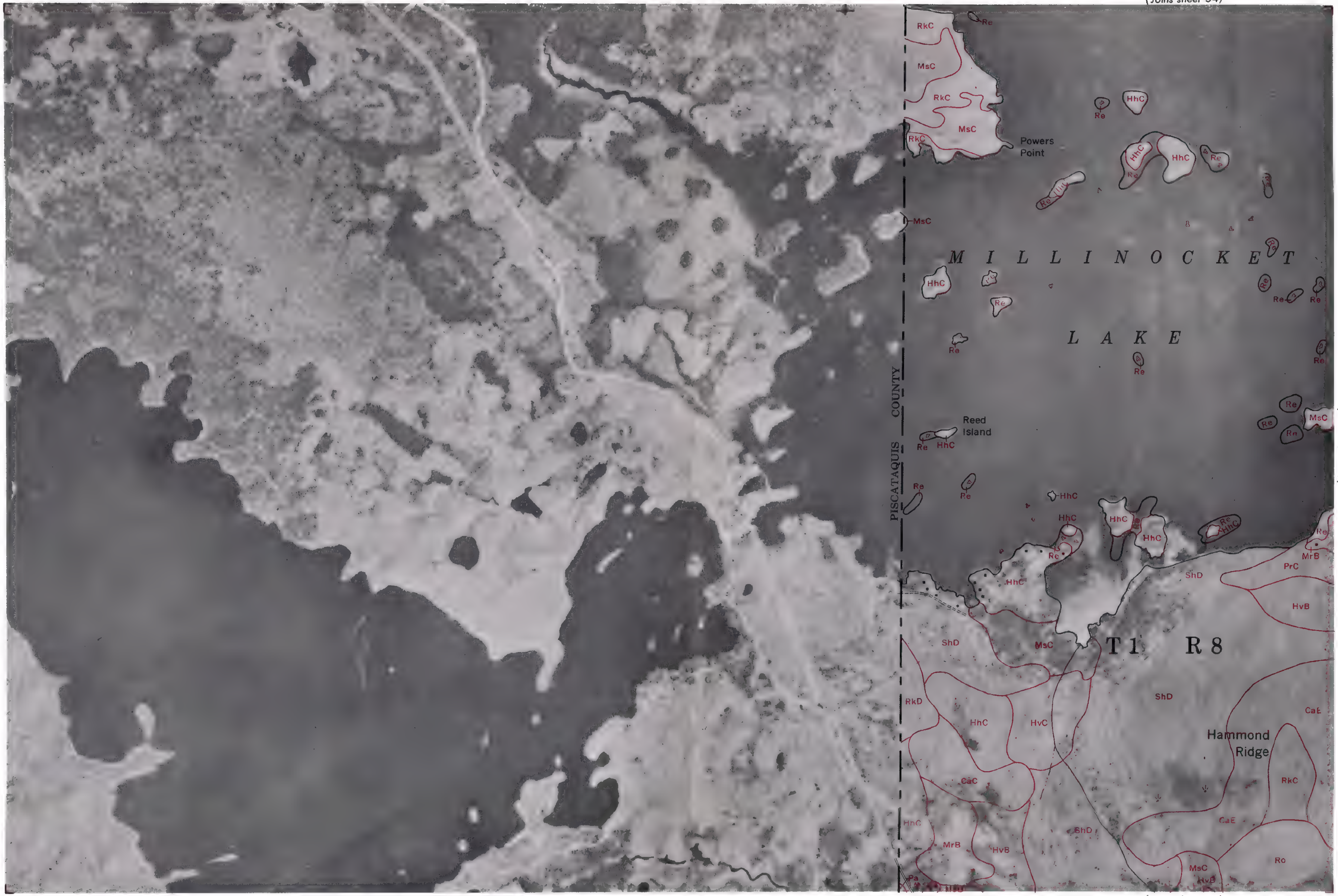
0 ½ 1 Mile Scale 1:20 000 0 5000 Feet

This map is one of a set compiled in 1962, as part of a soil survey by the Soil Conservation Service, United States Department of Agriculture, and the Maine Agricultural Experiment Station.



0 ½ 1 Mile Scale 1:20 000 0 5000 Feet

(Joins sheet 54)



(Joins sheet 60)

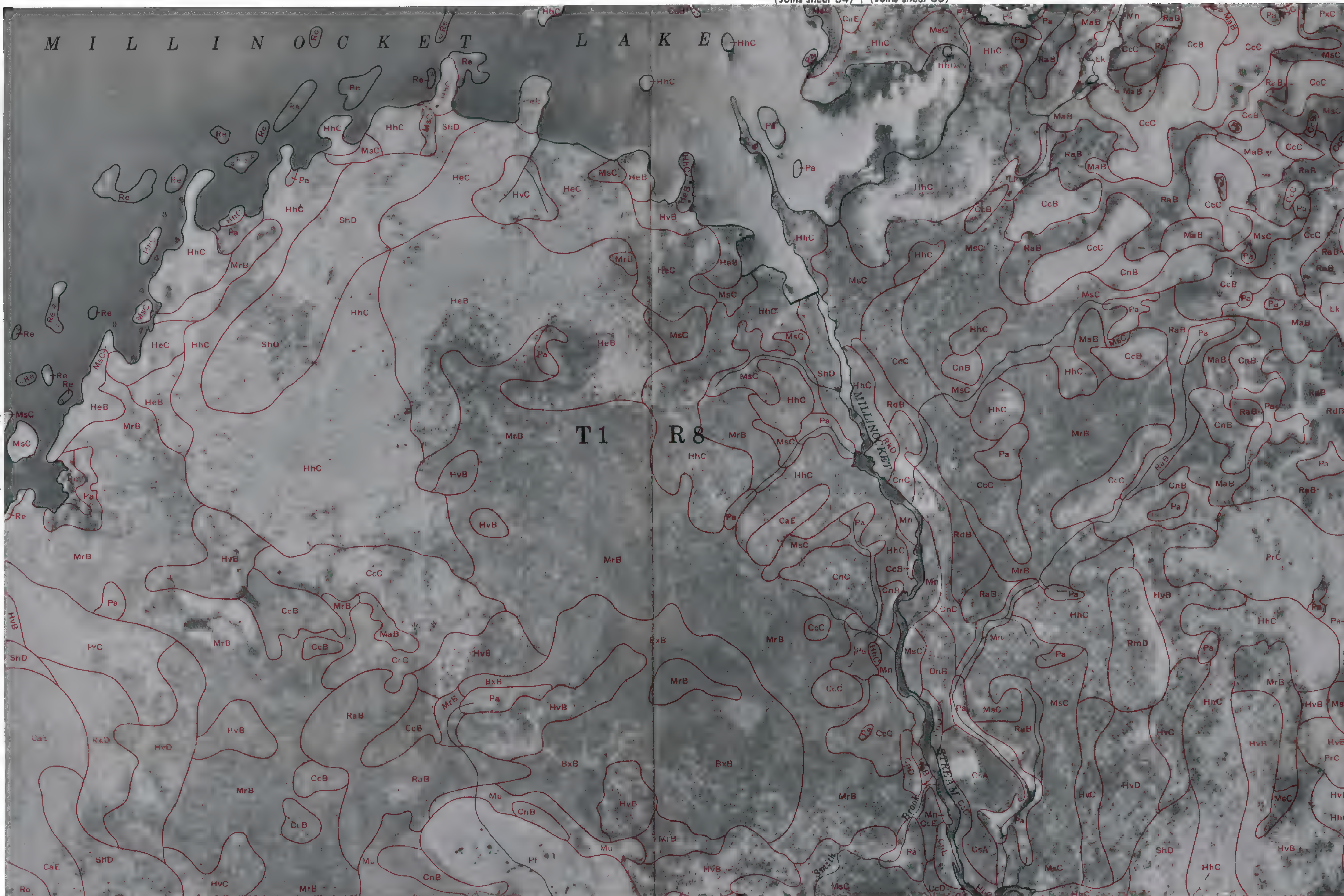
(Joins sheet 65)

0 ½ 1 Mile Scale 1:20 000 0 5000 Feet

This map is one of a set compiled in 1962, as part of a soil survey by the Soil Conservation Service, United States Department of Agriculture, and the Maine Agricultural Experiment Station.

60

(Joins sheet 54) | (Joins sheet 55)



(Joins sheet 66)

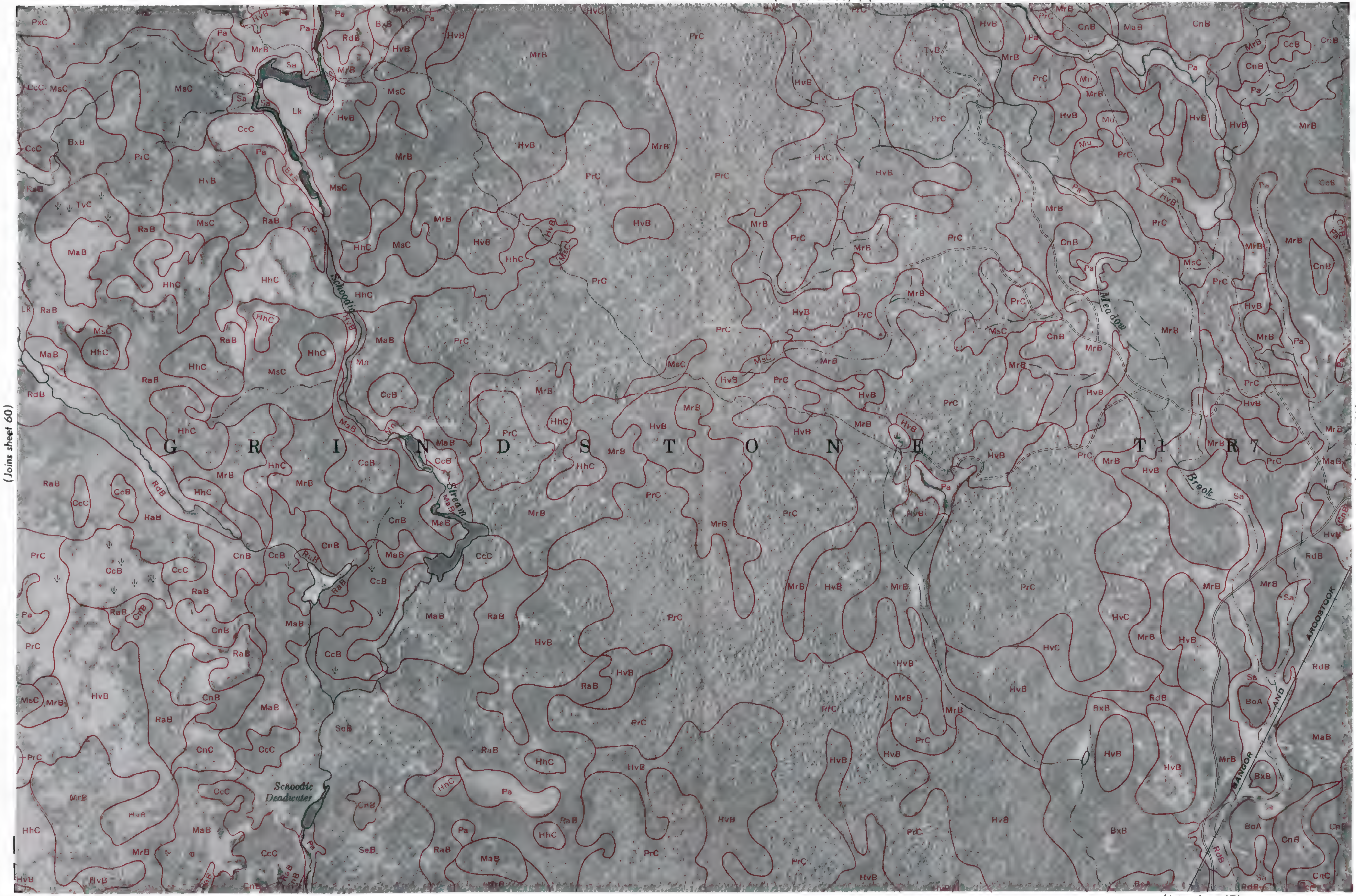
0 ½ 1 Mile Scale 1:20 000 0 5000 Feet

(Joins sheet 55) | (Joins sheet 56)

61

N

(Joins sheet 60)



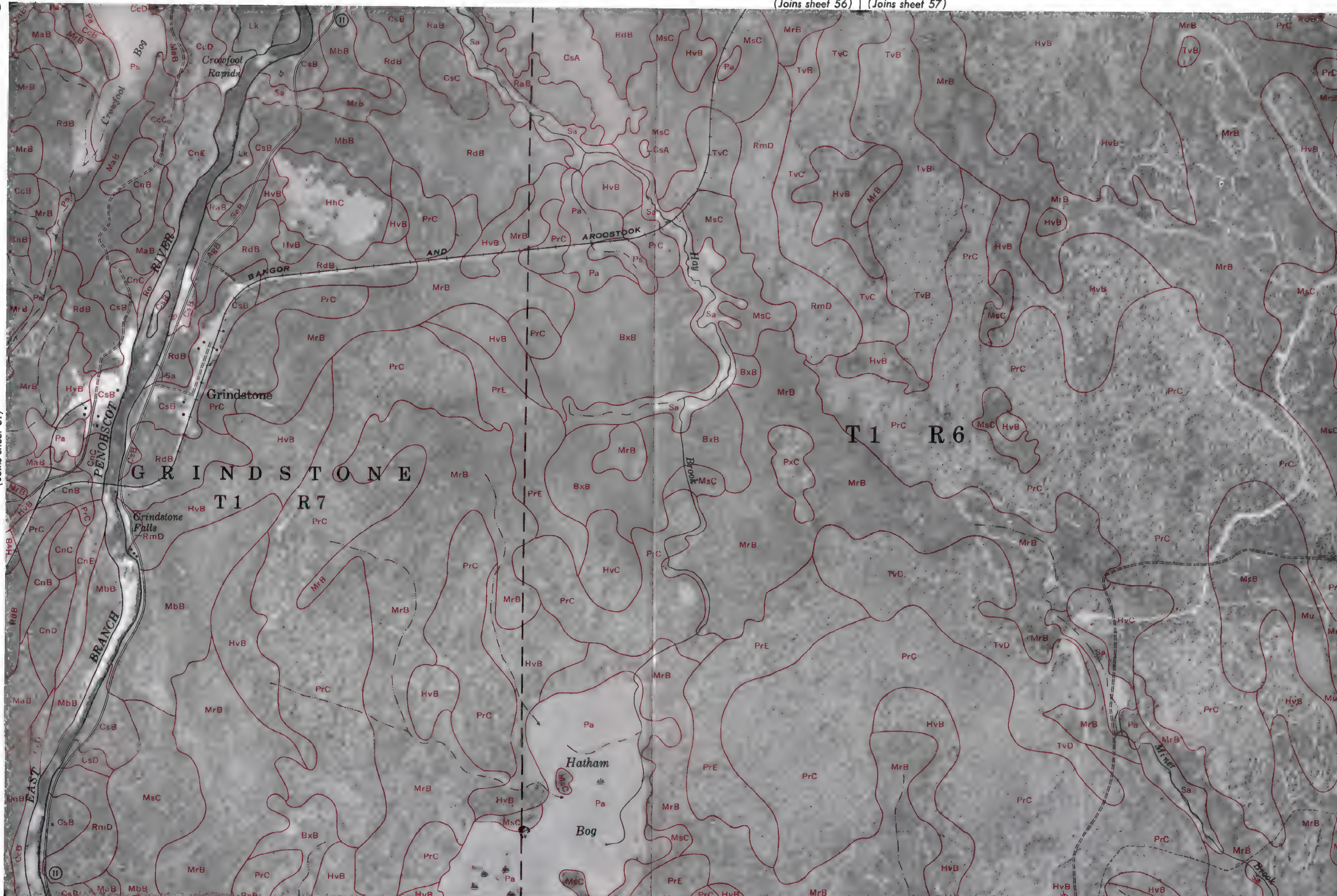
(Joins sheet 62)

(Joins sheet 67)

0 ½ 1 Mile Scale 1:20 000 0 5000 Feet

This map is one of a set compiled in 1962, as part of a soil survey by the Soil Conservation Service, United States Department of Agriculture, and the Maine Agricultural Experiment Station.

(Joins sheet 56) | (Joins sheet 57)



(Joins sheet 61)

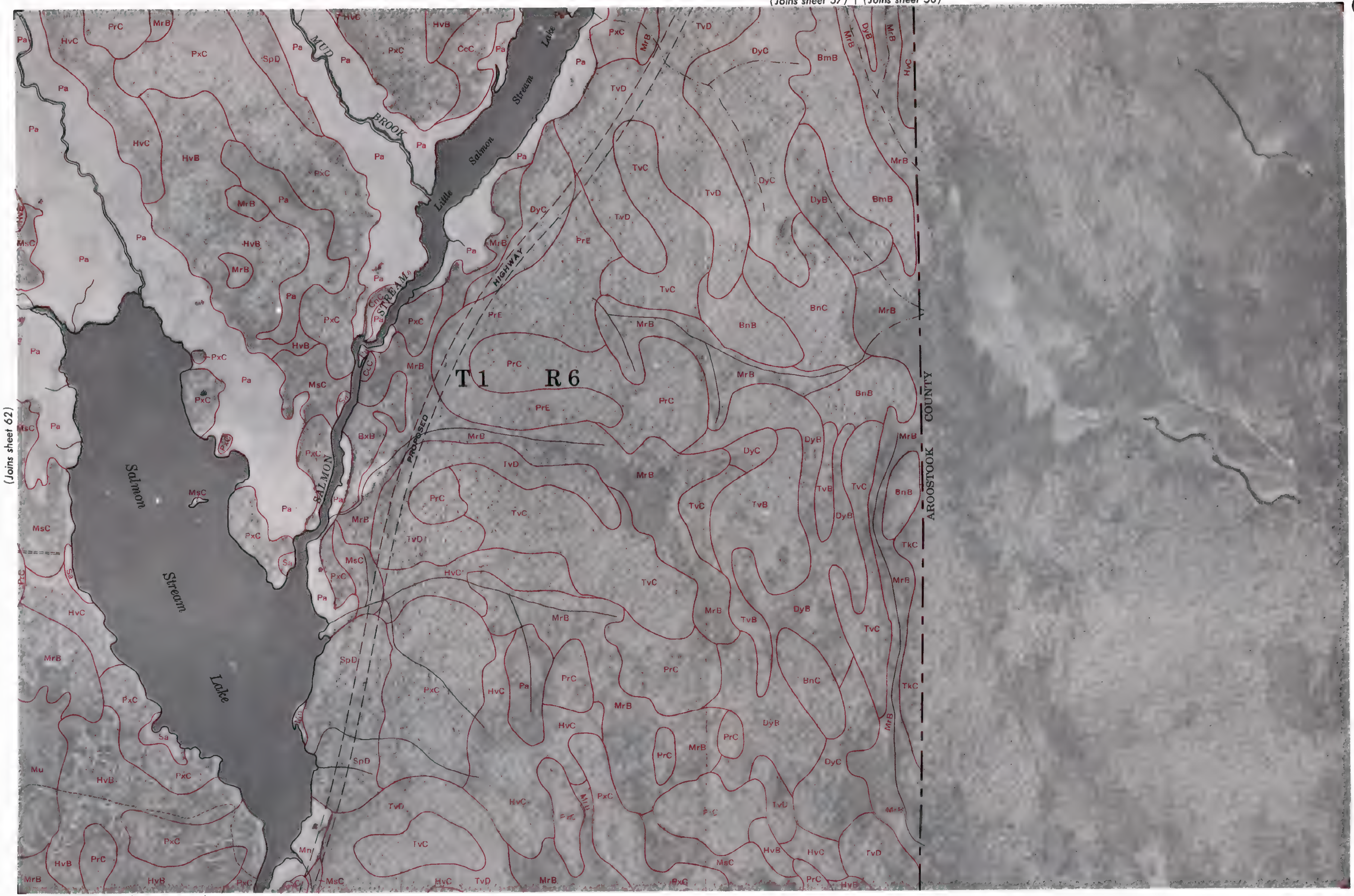
(Joins sheet 63)

(Joins sheet 68)

0 ½ 1 Mile Scale 1:20 000 0 5000 Feet

(Joins sheet 57) | (Joins sheet 58)

(Joins sheet 62)

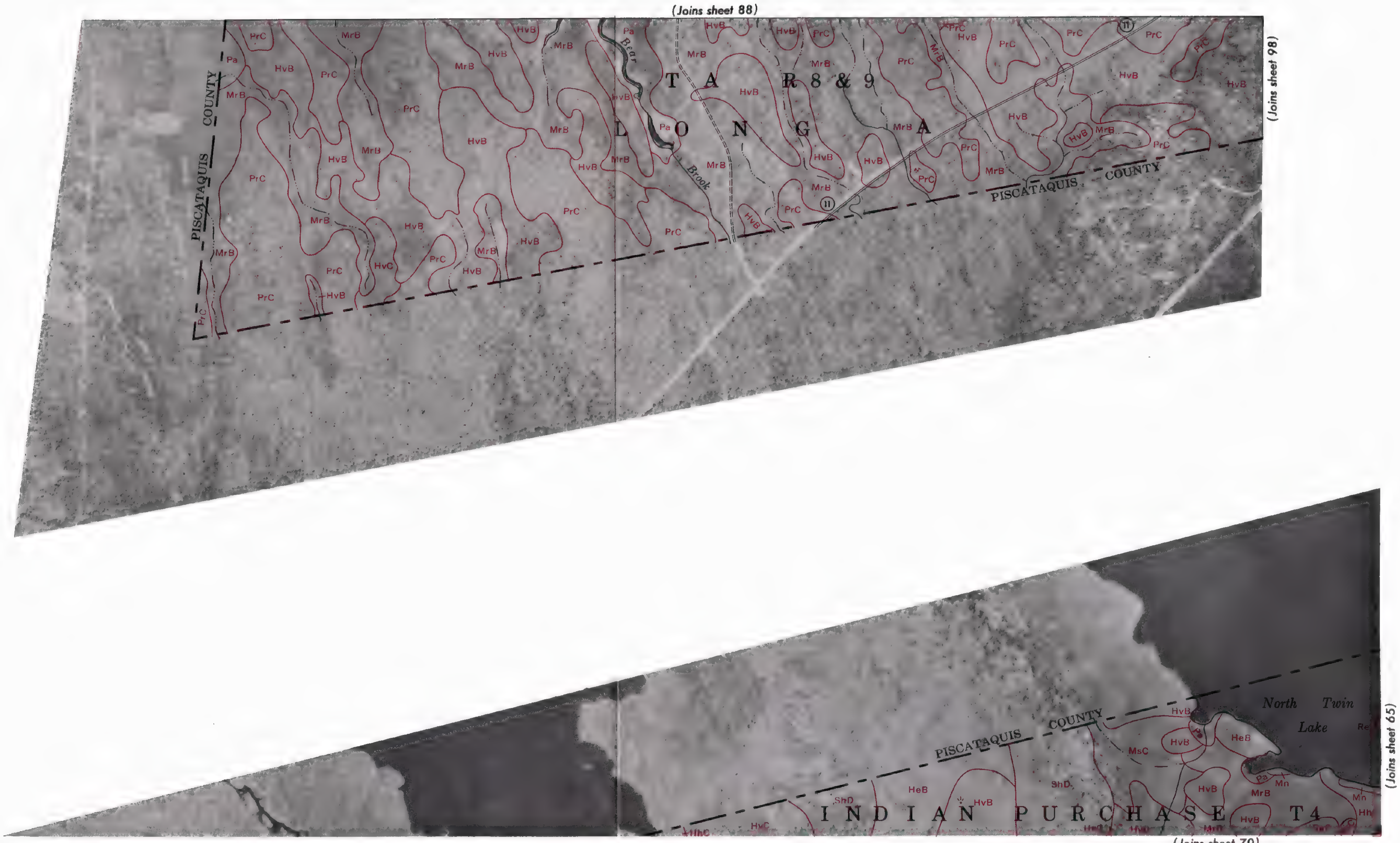


(Joins sheet 69)

0 ½ 1 Mile Scale 1:20 000 0 5000 Feet

This map is one of a set compiled in 1962, as part of a soil survey by the Soil Conservation Service, United States Department of Agriculture, and the Maine Agricultural Experiment Station.

N

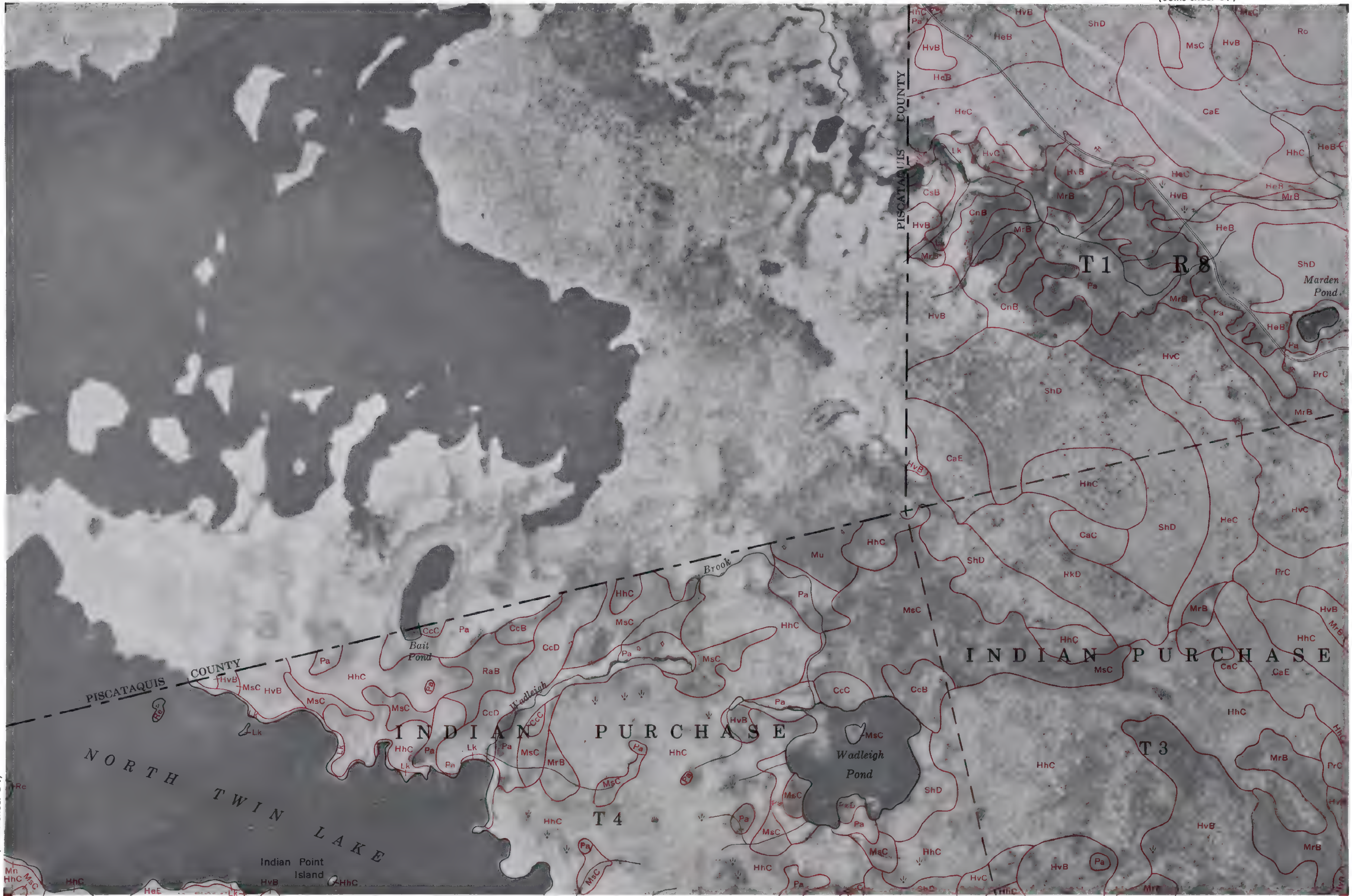


0 ½ 1 Mile Scale 1:20 000 0 5000 Feet

(Joins sheet 59)

65

N



(Joins sheet 64)

(Joins sheet 66)

(Joins sheet 71)

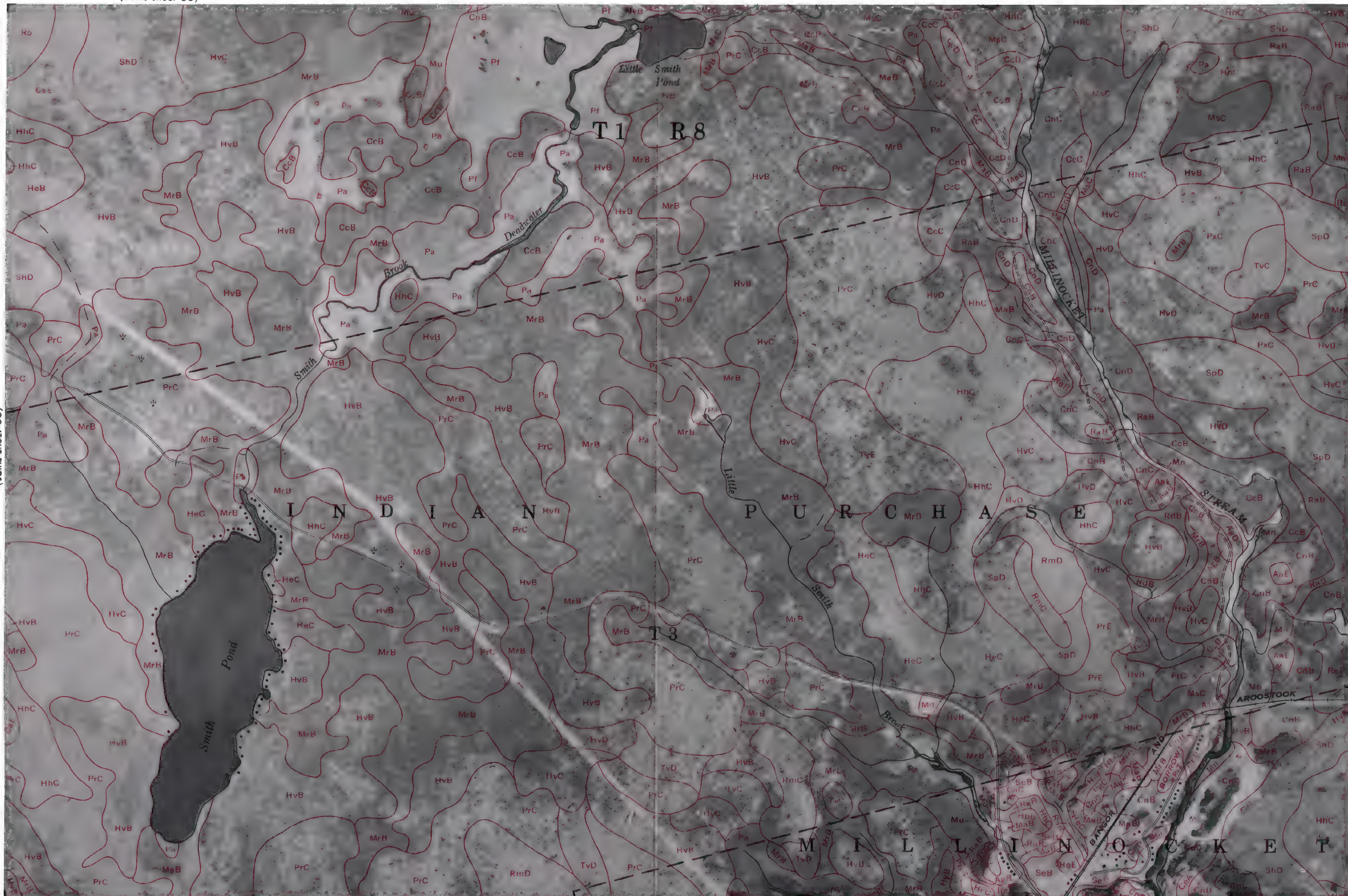
0 ½ 1 Mile Scale 1:20 000 0 5000 Feet

This map is one of a set compiled in 1962, as part of a soil survey by the Soil Conservation Service, United States Department of Agriculture, and the Maine Agricultural Experiment Station.

66

(Joins sheet 60)

(Joins sheet 65)



(Joins sheet 67)

(Joins sheet 72)

0 ½ 1 Mile Scale 1:20 000 0 5000 Feet

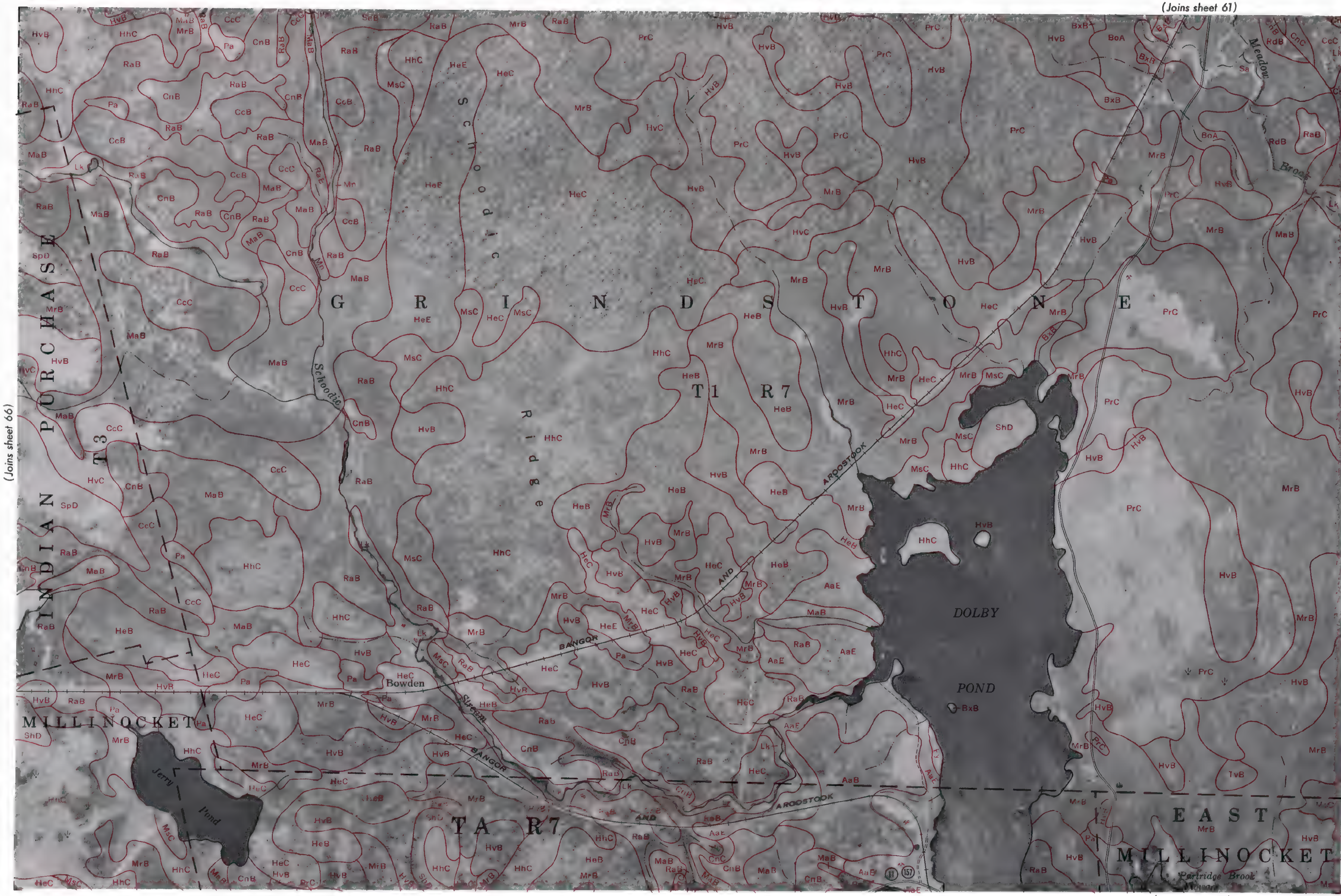
(67)

(Joins sheet 61)

N

(Joins sheet 66)

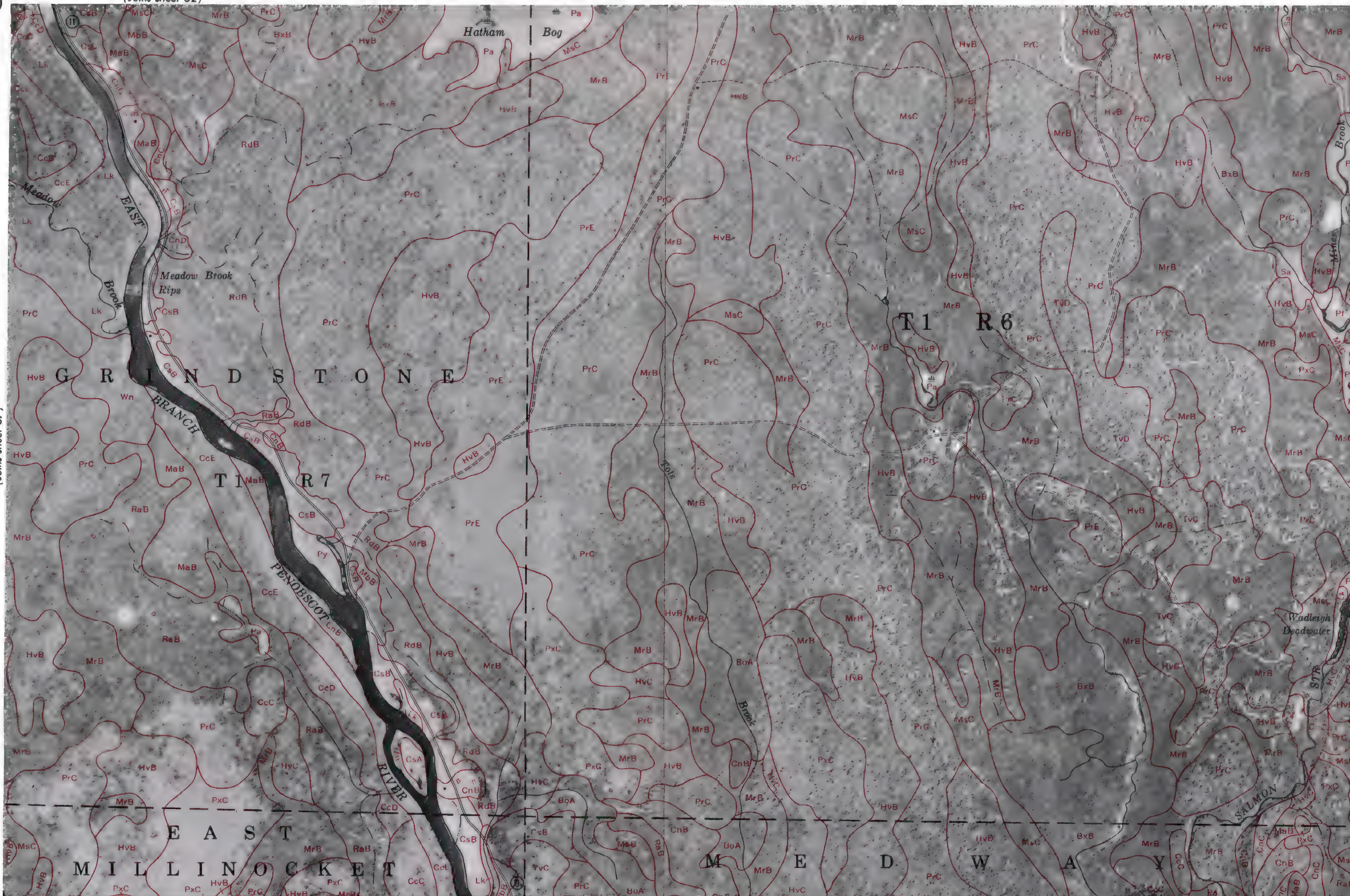
(Joins sheet 68)



(Joins sheet 73)

0 ½ 1 Mile Scale 1:20 000 0 5000 Feet

This map is one of a set compiled in 1962, as part of a soil survey by the Soil Conservation Service, United States Department of Agriculture, and the Maine Agricultural Experiment Station.

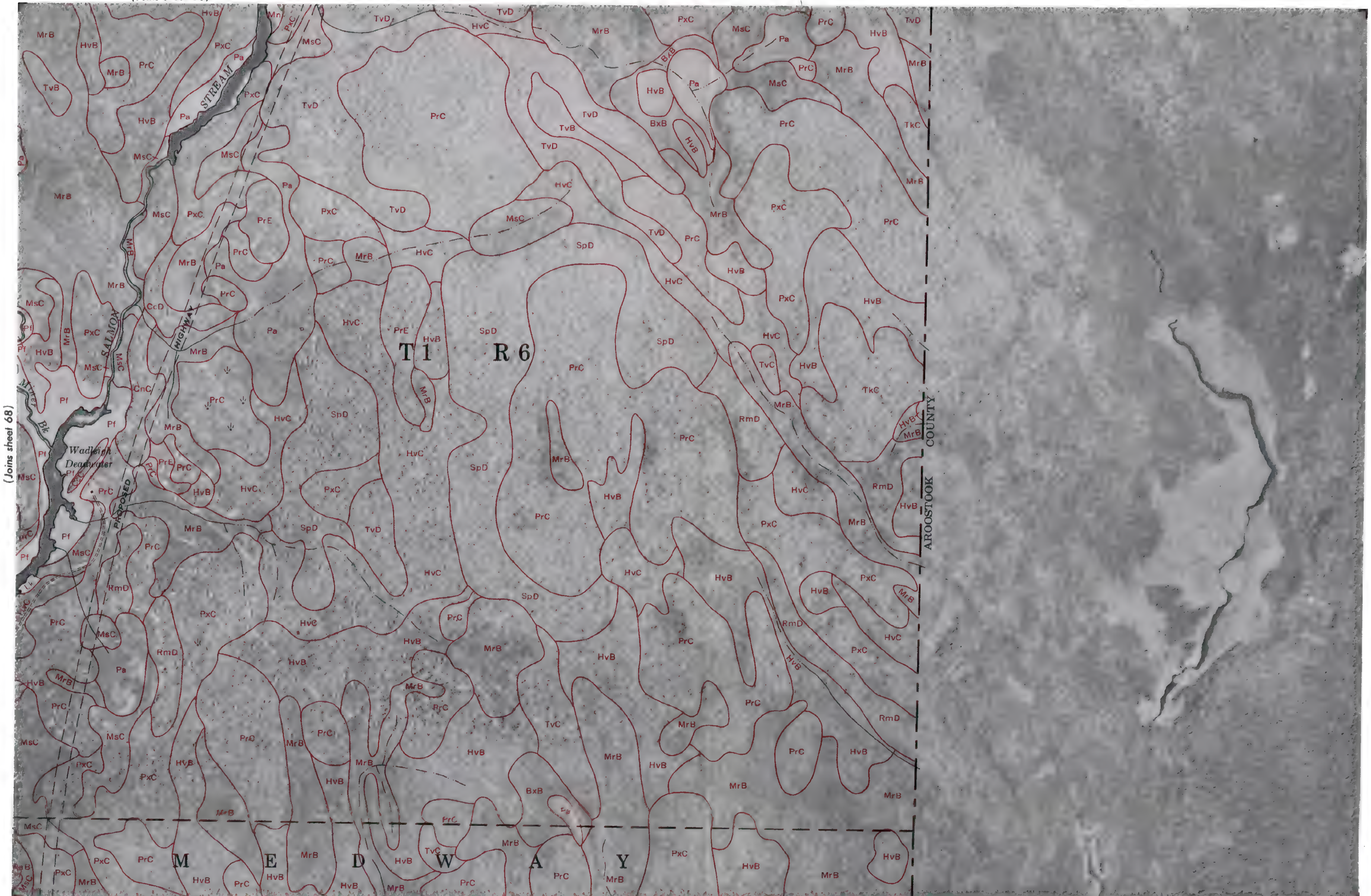


0 ½ 1 Mile Scale 1:20 000 0 5000 Feet

69

(Joins sheet 63)

(Joins sheet 68)



(Joins sheet 75)

0 ½ 1 Mile Scale 1:20 000 0 5000 Feet

This map is one of a set compiled in 1962, as part of a soil survey by the Soil Conservation Service, United States Department of Agriculture, and the Maine Agricultural Experiment Station.


70
N
(Joins sheet 64)
(Joins sheet 71)
(Joins sheet 78)
LOWER JO-MARY LAKE
Jo-Mary Island
HAYNES CAMPS
MIDDLE JO-MARY LAKE
INDIAN PURCHASE
T 4
Lincoln Ridge
Lincoln Pond
Turkey Tail Islands
Turkey Tail Lake
SOUTH TWIN LAKE
PISCATAQUIS COUNTY
VEASIE GORE
0
½
1 Mile
Scale 1:20 000
0
5000 Feet

0 ½ 1 Mile Scale 1:20 000 0 5000 Feet

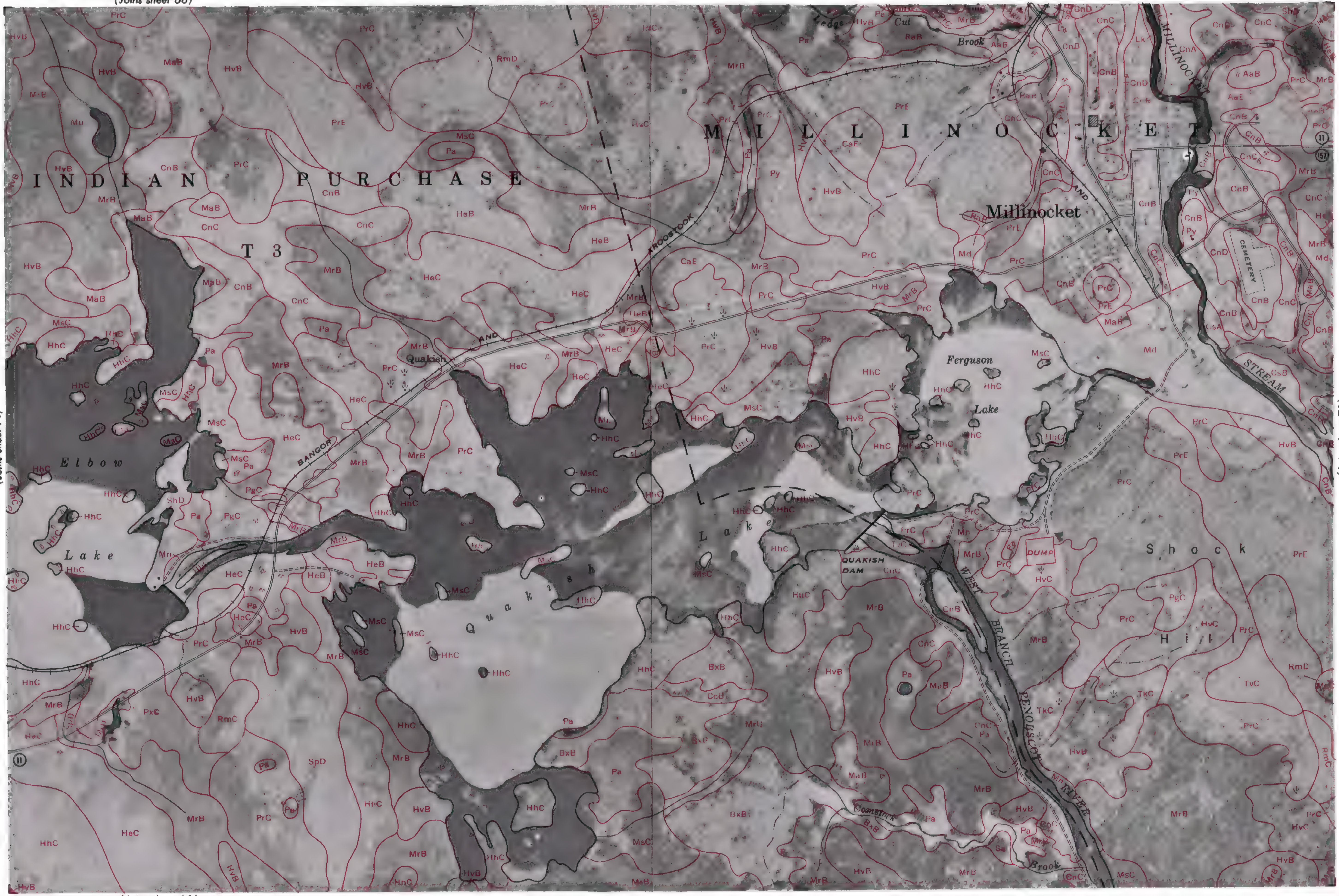
This map is one of a set compiled in 1962, as part of a soil survey by the Soil Conservation Service, United States Department of Agriculture, and the Maine Agricultural Experiment Station.

72

(Joins sheet 66)

N

(Joins sheet 71)



(Joins sheet 73)

(Joins sheet 80)

0 ½ 1 Mile Scale 1:20 000 0 5000 Feet

(Joins sheet 67)

(Joins sheet 81)

0 ½ 1 Mile Scale 1:20 000 0 5000 Feet

This map is one of a set compiled in 1962, as part of a soil survey by the Soil Conservation Service, United States Department of Agriculture, and the Maine Agricultural Experiment Station.

74

(Joins sheet 68)

N

(Joins sheet 73)

(Joins sheet 75)

(Joins sheet 82)

0 ½ 1 Mile

Scale 1:20 000

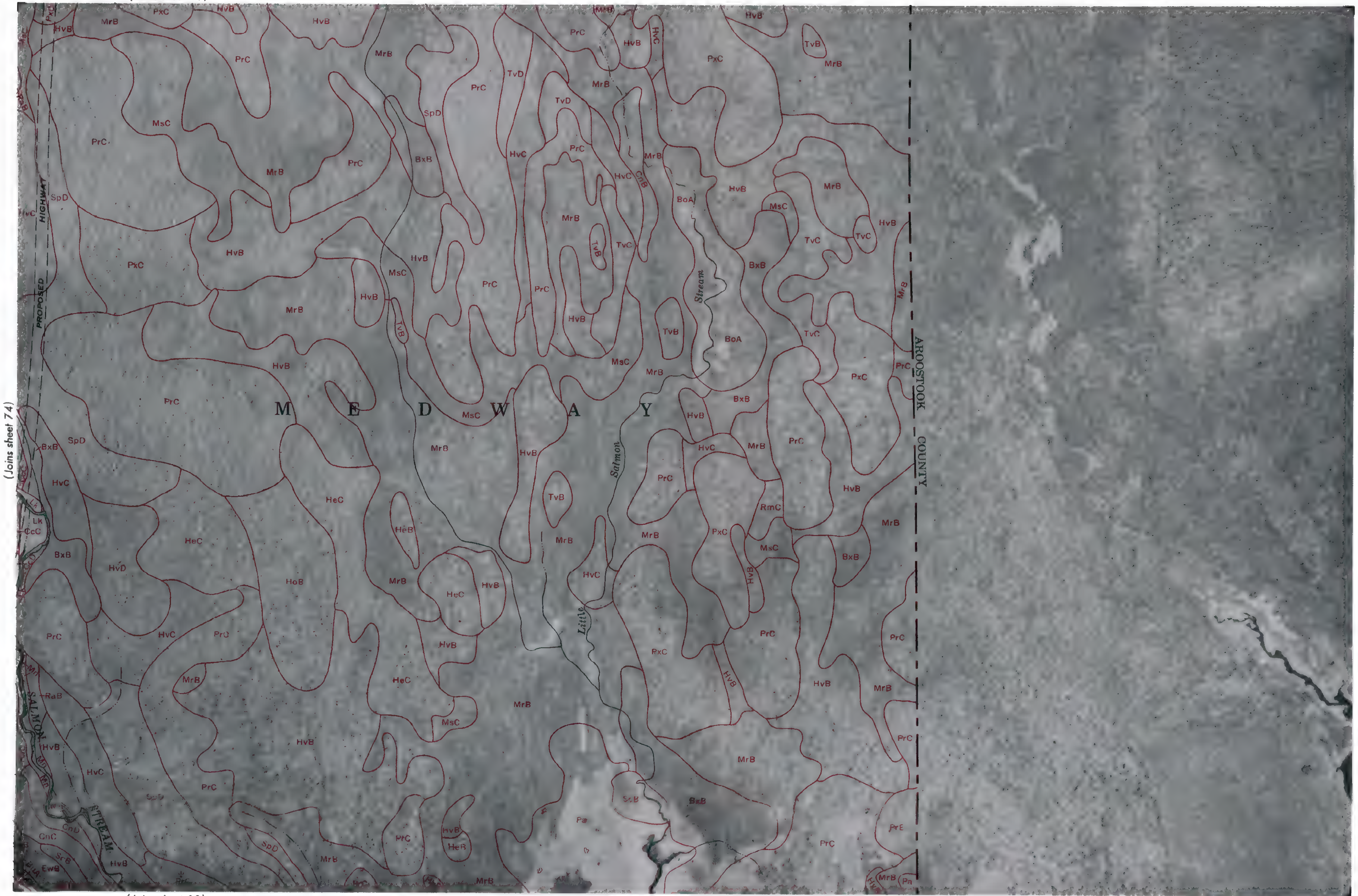
0 5000 Feet

PENOBSCOT COUNTY, MAINE — SHEET NUMBER 75

75

(Joins sheet 69)

(Joins sheet 74)



(Joins sheet 83)

0 ½ 1 Mile Scale 1:20 000 0 5000 Feet

This map is one of a set compiled in 1962, as part of a soil survey by the Soil Conservation Service, United States Department of Agriculture, and the Maine Agricultural Experiment Station.

N

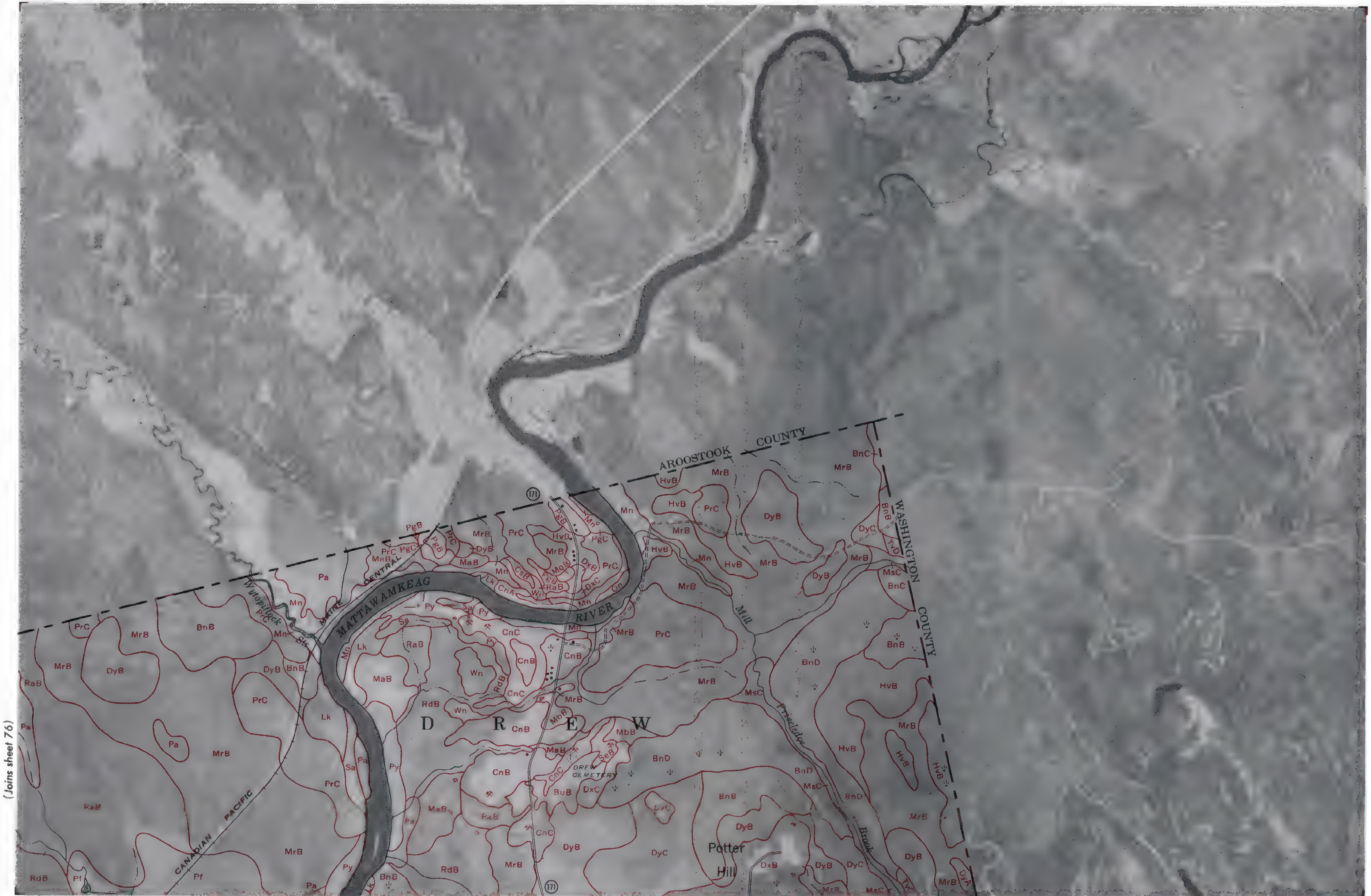
0 ½ 1 Mile Scale 1:20 000 0 5000 Feet

(Joins sheet 86)

(Joins sheet 77)

N

This map is one of a set compiled in 1962, as part of a soil survey by the Soil Conservation Service, United States Department of Agriculture, and the Maine Agricultural Experiment Station.



(Joins sheet 76)

(Joins sheet 87)

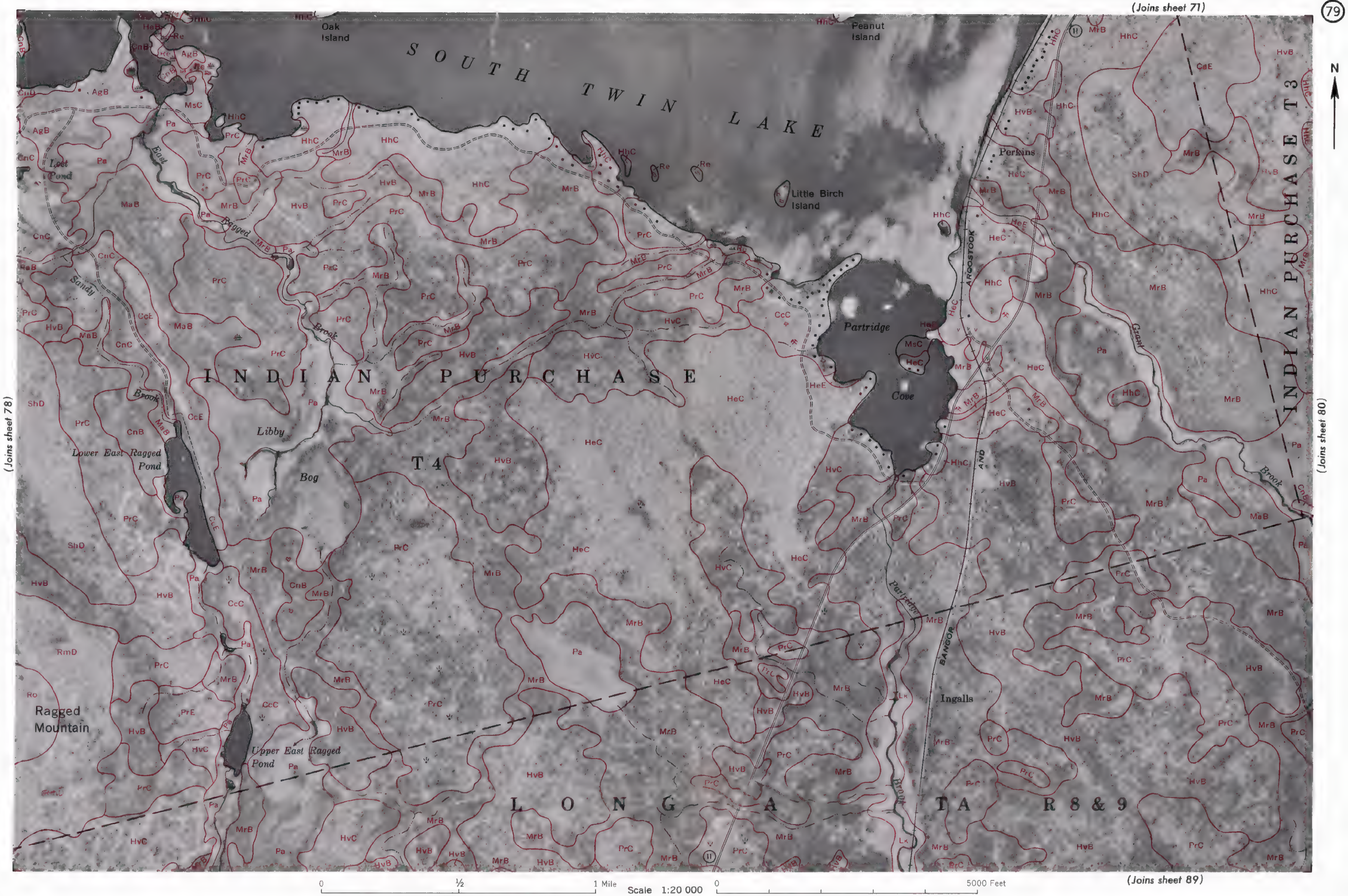
0 ½ 1 Mile Scale 1:20 000 0 5000 Feet

(Joins sheet 70)

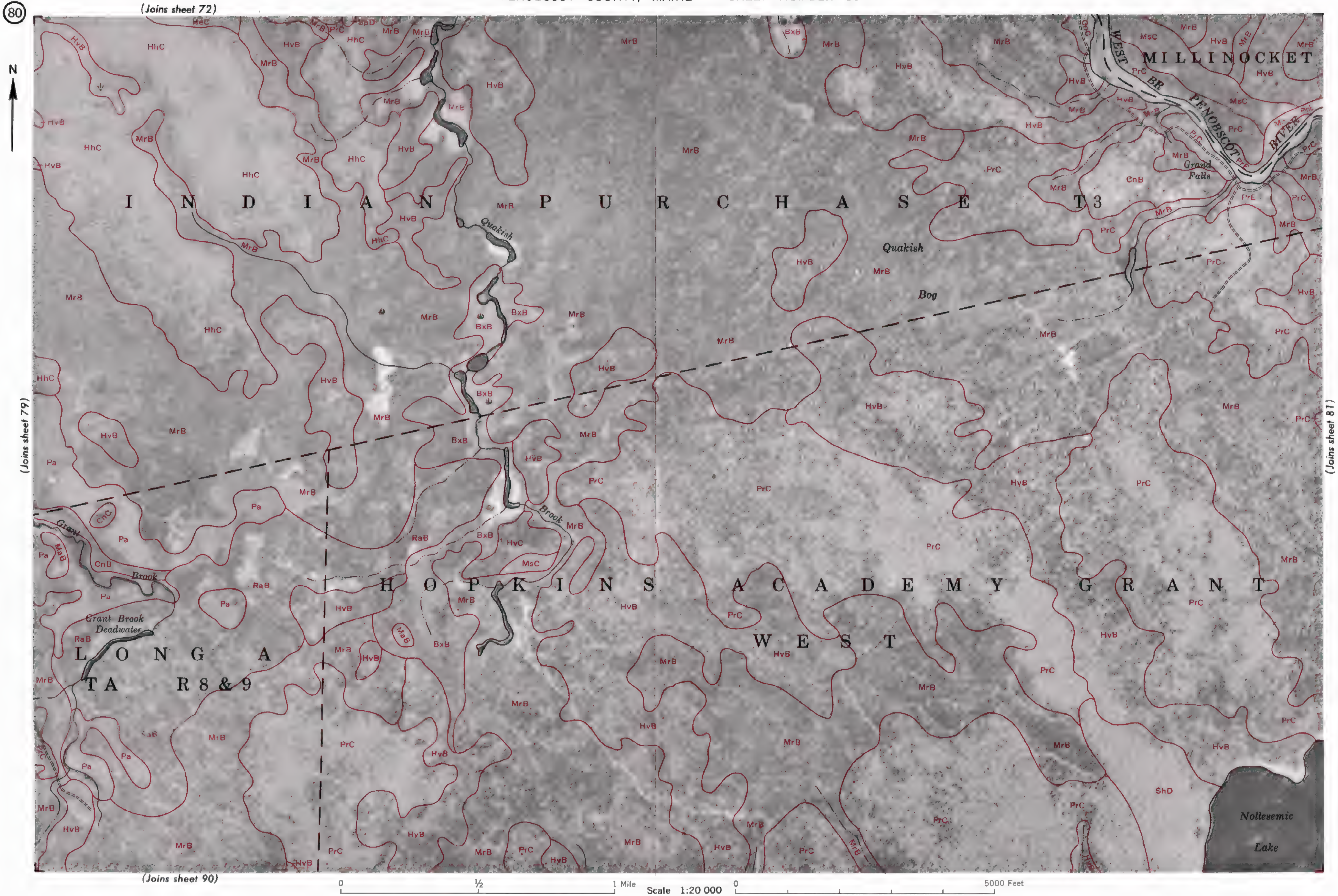
(Joins sheet 79)

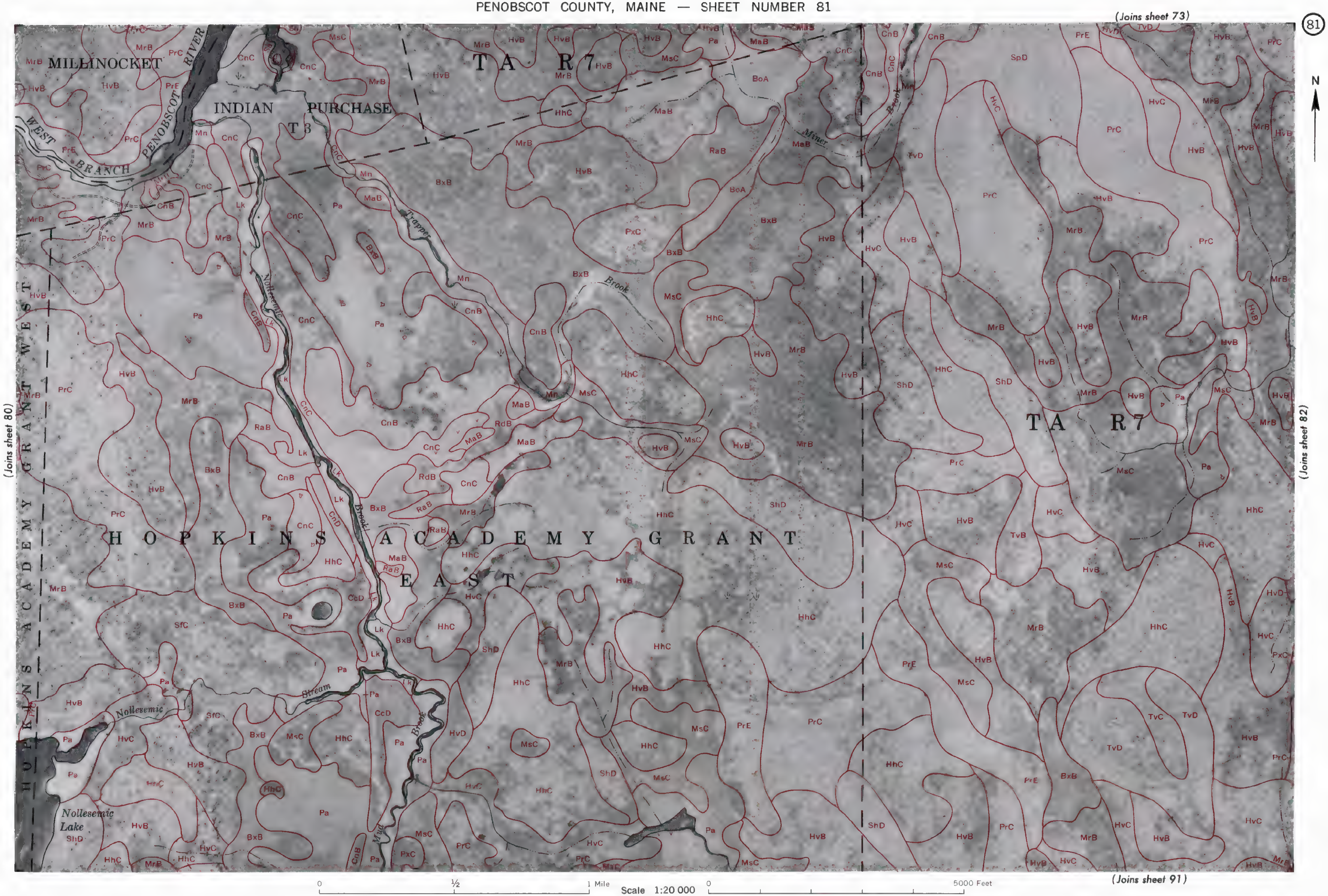
(Joins sheet 88)

0 ½ 1 Mile Scale 1:20 000 0 5000 Feet



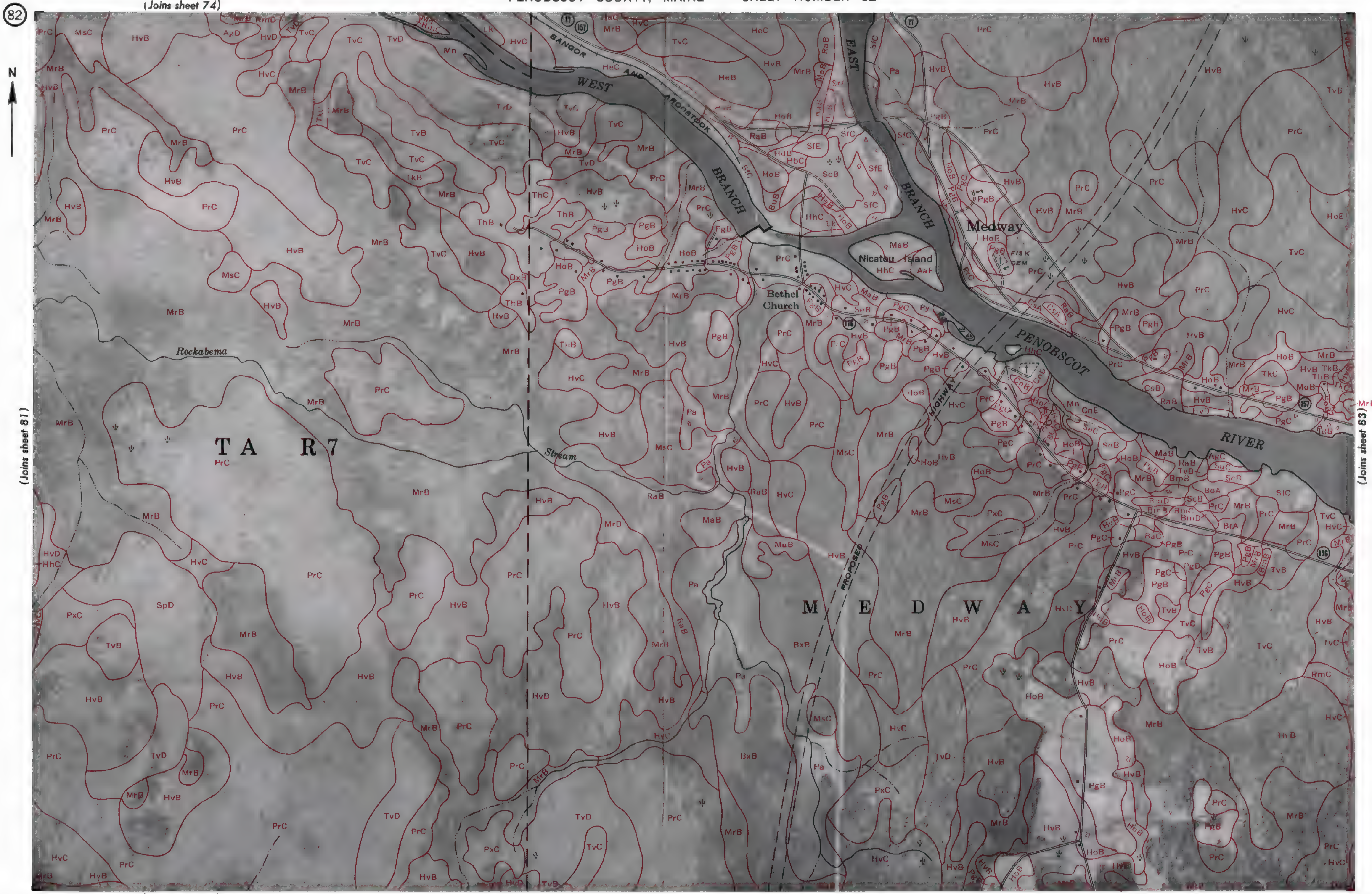
This map is one of a set compiled in 1962, as part of a soil survey by the Soil Conservation Service, United States Department of Agriculture, and the Maine Agricultural Experiment Station.


80
(Joins sheet 72)
N
I N D I A N P U R C H A S E T3
M I L L I N O C K E T
WEST BR PENOBSCOT RIVER
Grand Falls
Quakish
Quakish
Bog
Brook
Grant
Brook
Grant Brook
Deadwater
H O P K I N S A C A D E M Y G R A N T
W E S T
L O N G A
T A R 8 & 9
Nollesemic
Lake
(Joins sheet 79)
(Joins sheet 81)
(Joins sheet 90)
0
½
1 Mile
Scale 1:20 000
0
5000 Feet



This map is one of a set compiled in 1962, as part of a soil survey by the Soil Conservation Service, United States Department of Agriculture, and the Maine Agricultural Experiment Station.

(Joins sheet 74)

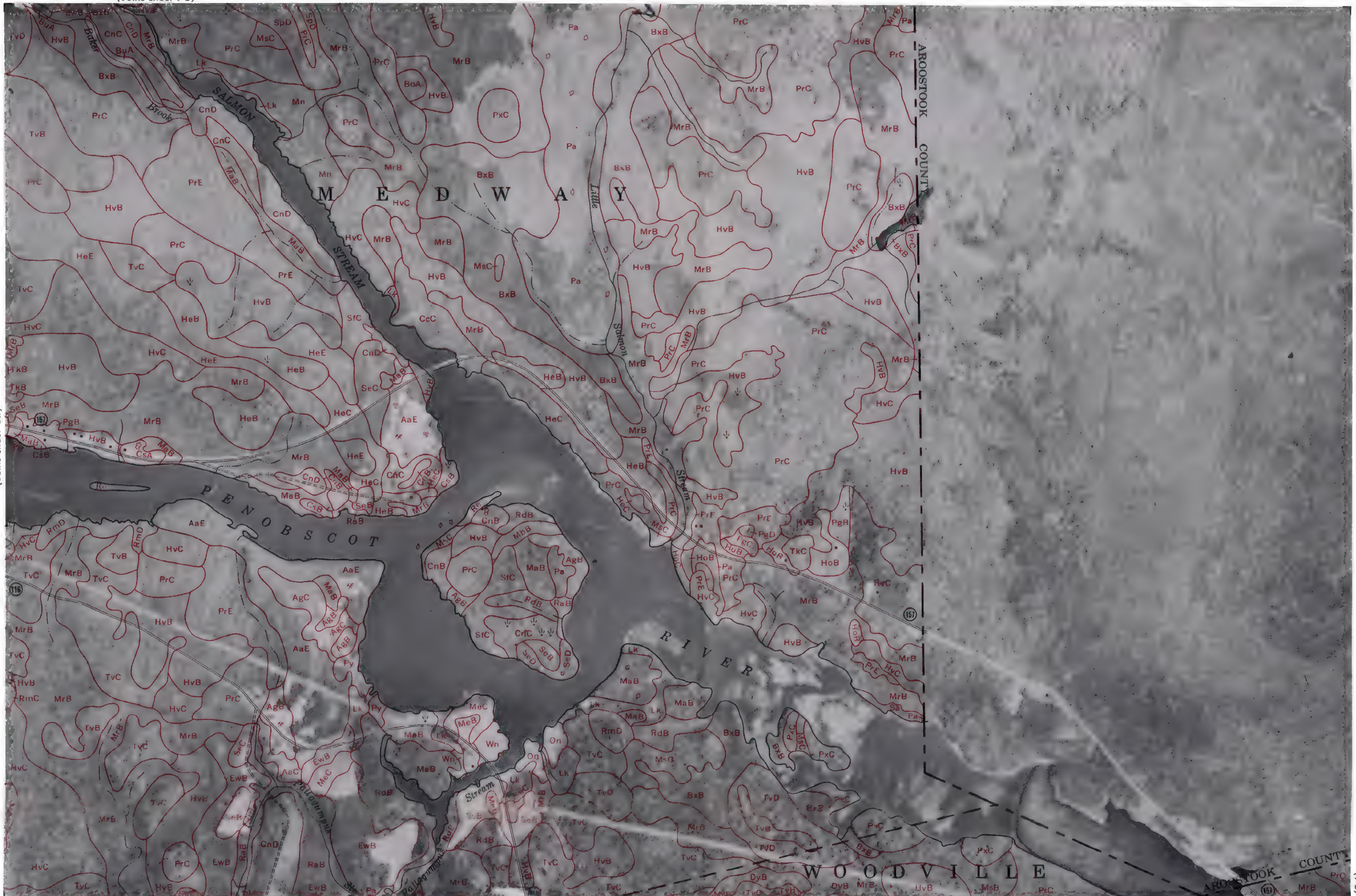


(Joins sheet 92)

0 ½ 1 Mile Scale 1:20 000 0 5000 Feet

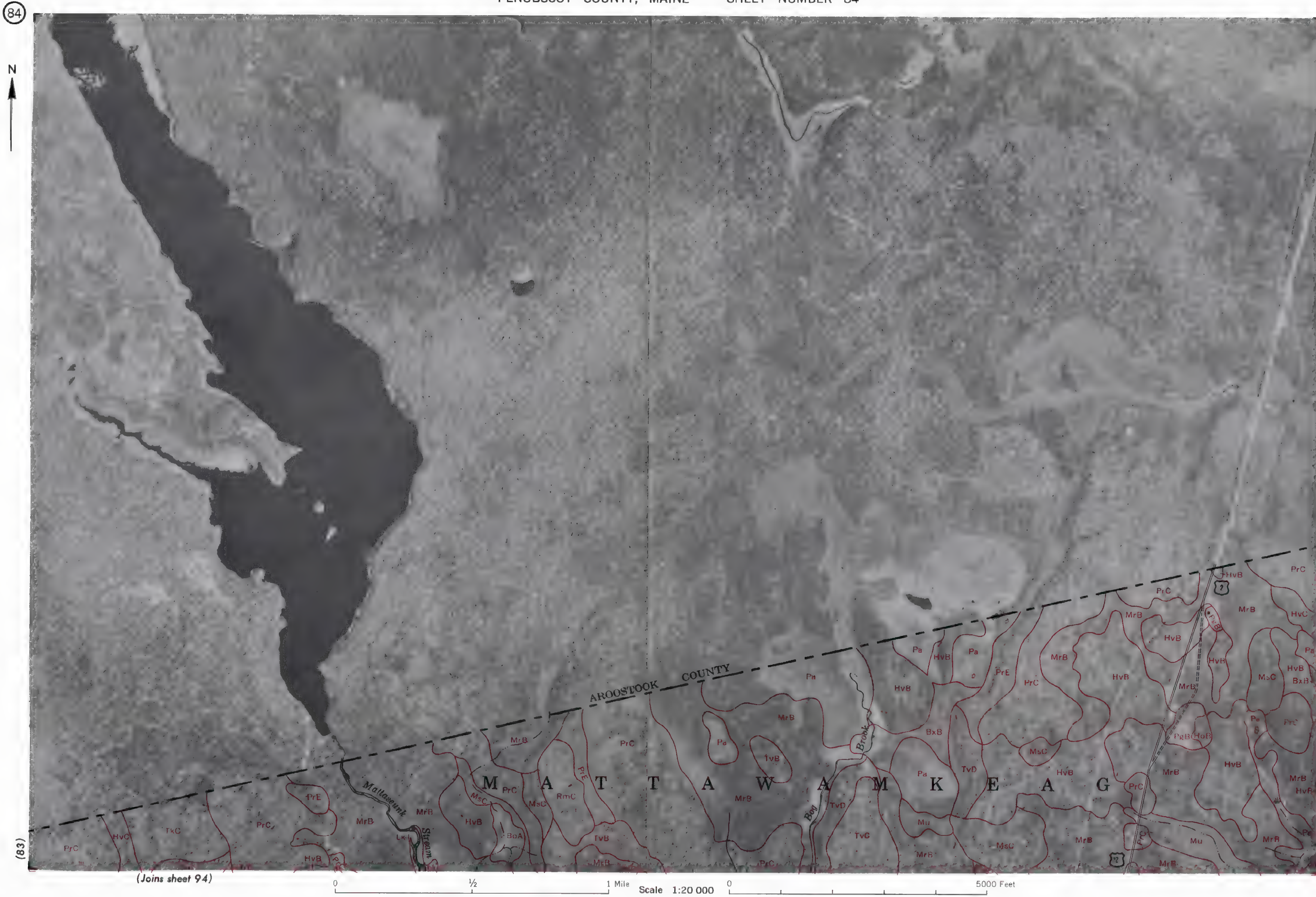
(Joins sheet 75)

83

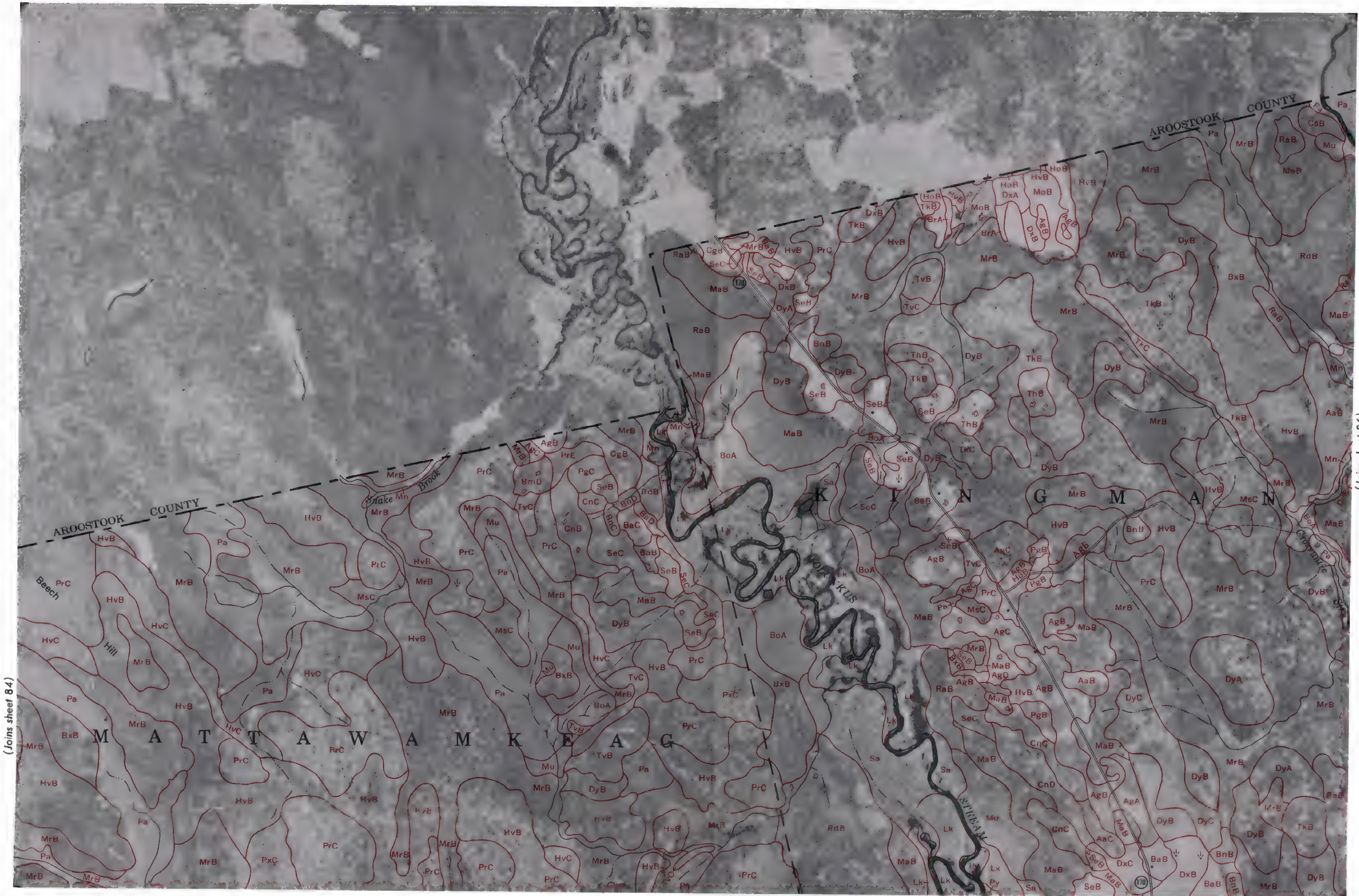


0 ½ 1 Mile Scale 1:20 000 0 5000 Feet

This map is one of a set compiled in 1962, as part of a soil survey by the Soil Conservation Service, United States Department of Agriculture, and the Maine Agricultural Experiment Station.


84
N
AROOSTOOK COUNTY
M A T T A W A M K E A G
Mattaseunk Stream
Bog Brook
(Joins sheet 85)
(Joins sheet 94)
(83)
0
½
1 Mile
Scale 1:20 000
0
5000 Feet

This map is one of a set compiled in 1962, as part of a soil survey by the Soil Conservation Service, United States Department of Agriculture, and the Oregon Agricultural Experiment Station.

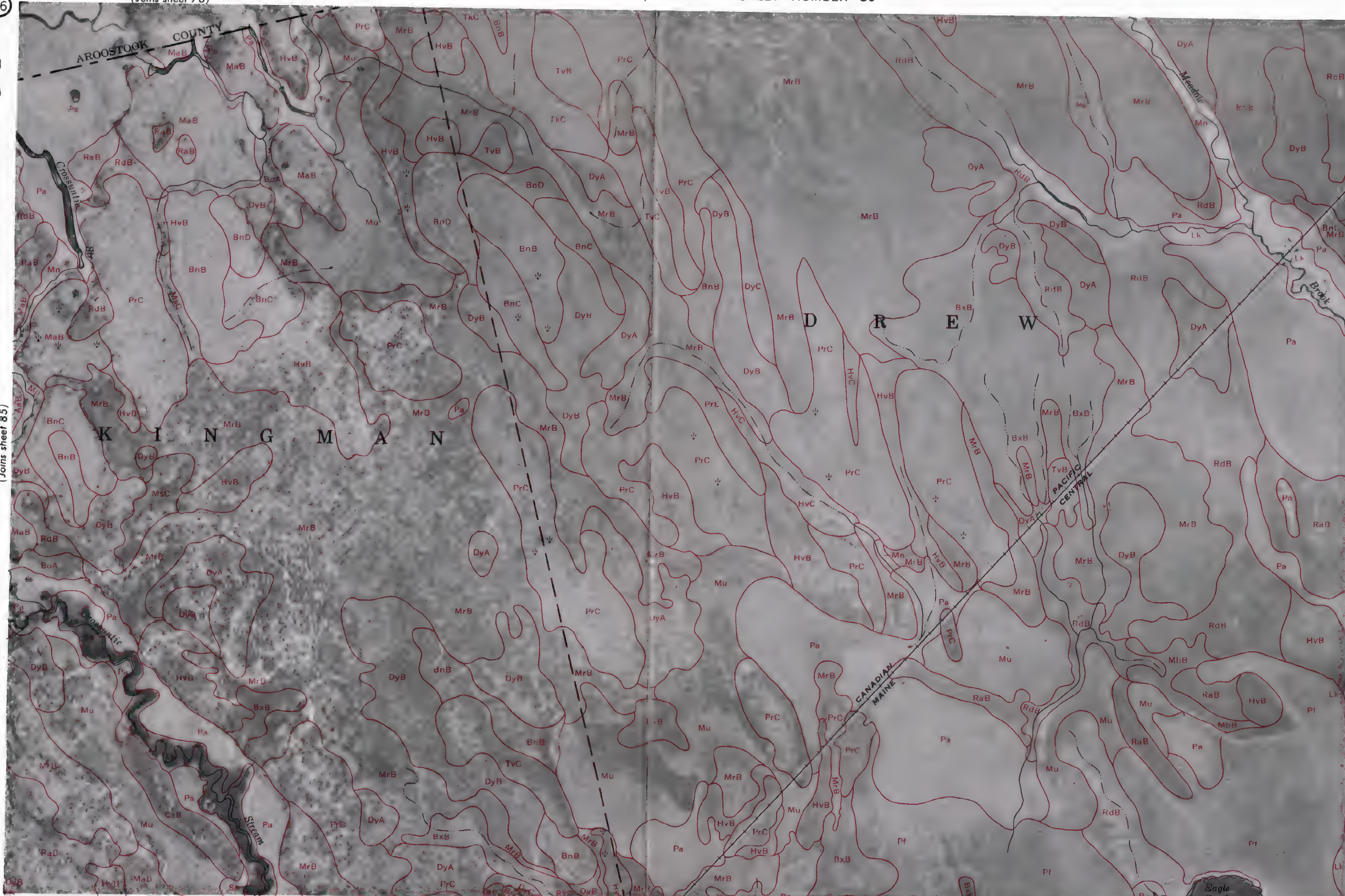


(Joins sheet 95)

0 ½ 1 Mile Scale 1:20 000 0 5000 Feet

(Joins sheet 76)

(Joins sheet 85)



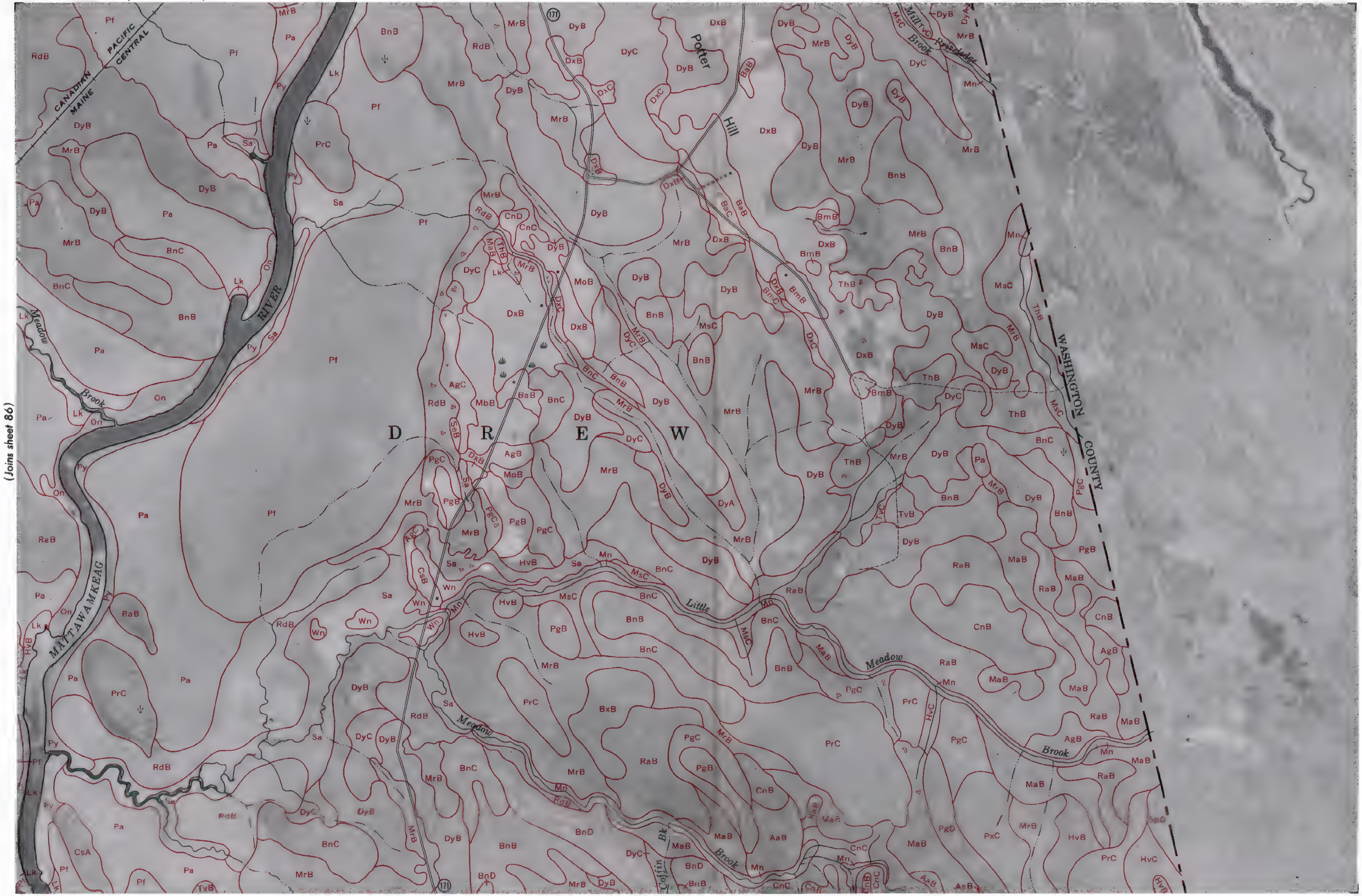
(Joins sheet 87)

(Joins sheet 96)

0 ½ 1 Mile Scale 1:20 000 0 5000 Feet

(Joins sheet 77)

(Joins sheet 86)



(Joins sheet 97)

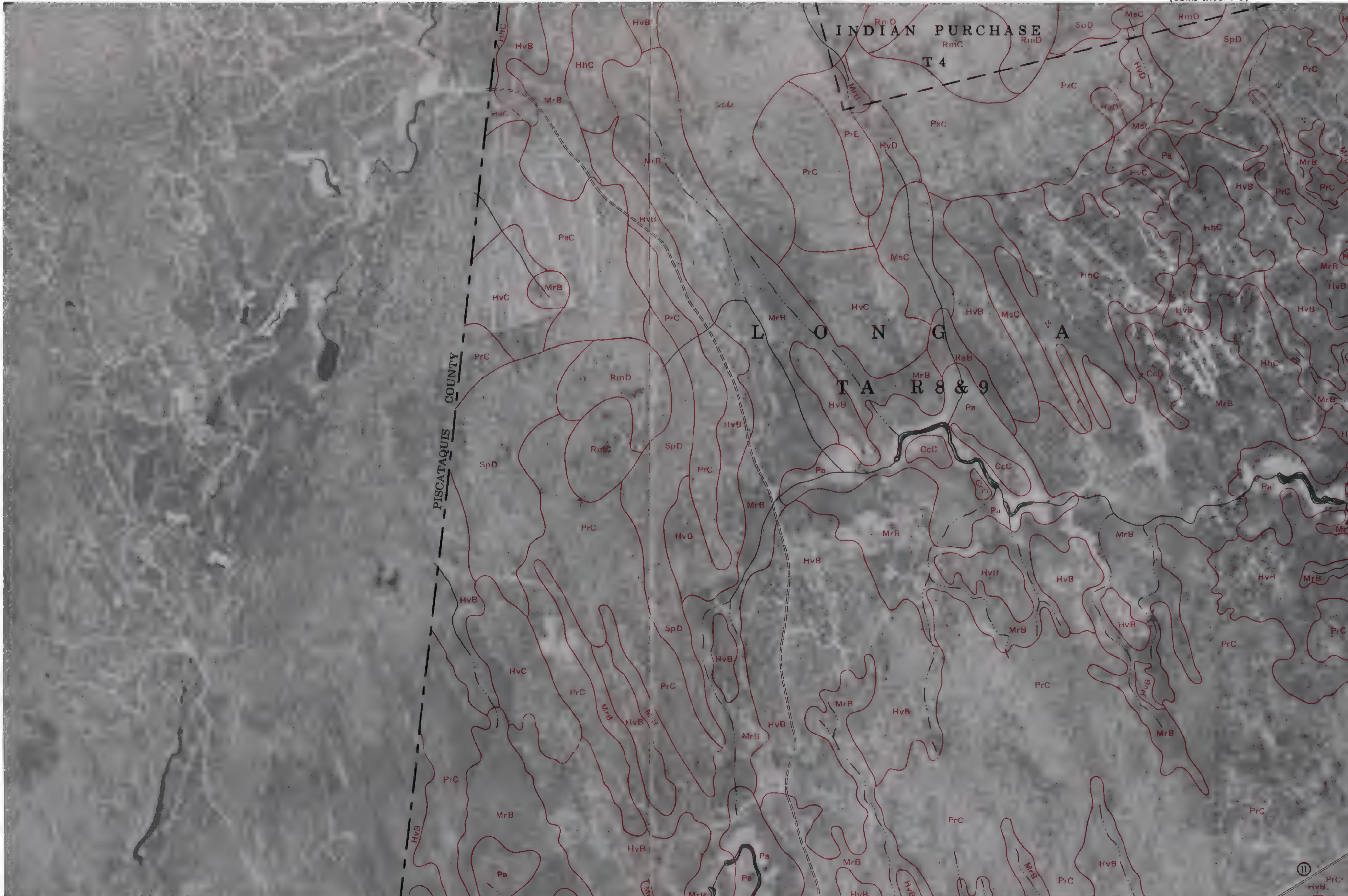
Scale 1:20 000
0 ½ 1 Mile
0 5000 Feet

This map is one of a set compiled in 1962, as part of a soil survey by the Soil Conservation Service, United States Department of Agriculture, and the Maine Agricultural Experiment Station.

88

N

(Joins sheet 78)



(Joins sheet 89)

0 ½ 1 Mile Scale 1:20 000 0 5000 Feet

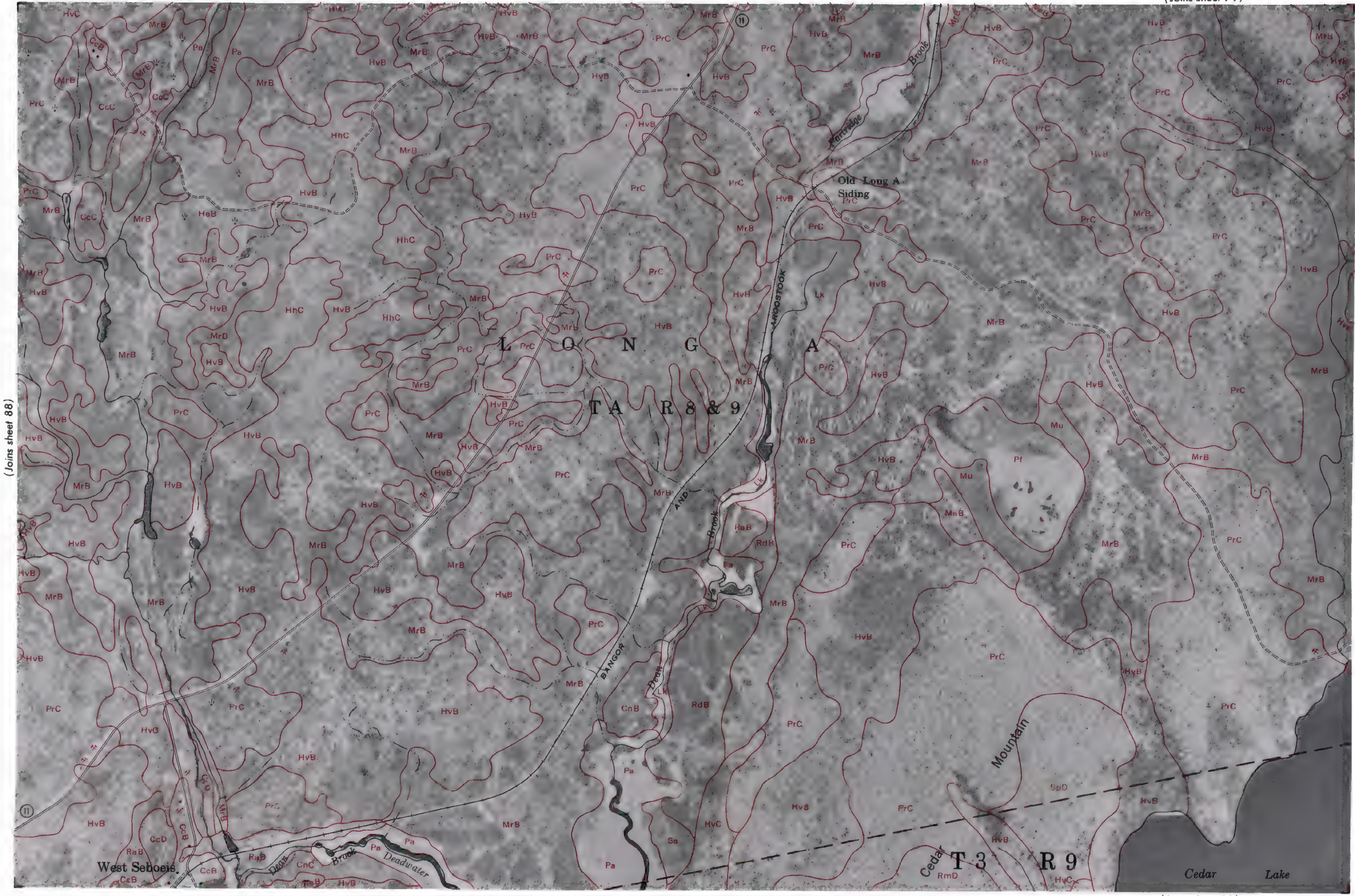
(Joins inset, sheet 64)

(Joins sheet 79)

89

This map is one of a set compiled in 1962, as part of a soil survey by the Soil Conservation Service, United States Department of Agriculture, and the Maine Agricultural Experiment Station.

(Joins sheet 88)



(Joins sheet 90)

(Joins sheet 98)

0 ½ 1 Mile Scale 1:20 000 0 5000 Feet

(Joins sheet 80)

(Joins sheet 89)

(Joins sheet 91)

(Joins sheet 99)

0 ½ 1 Mile

Scale 1:20 000

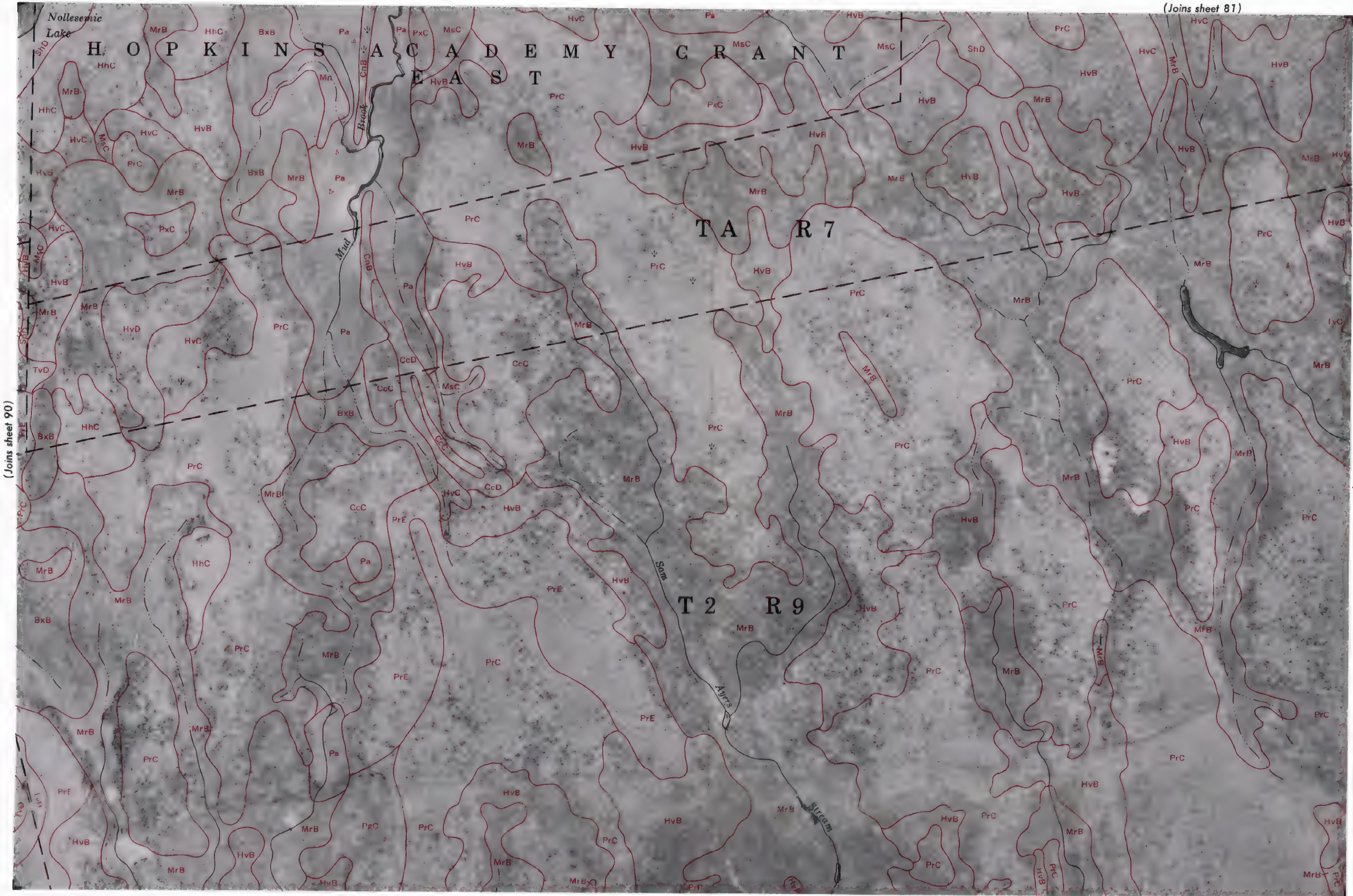
0 5000 Feet

(Joins sheet 81)

91

This map is one of a set compiled in 1962, as part of a soil survey by the Soil Conservation Service, United States Department of Agriculture, and the Maine Agricultural Experiment Station.

(Joins sheet 90)

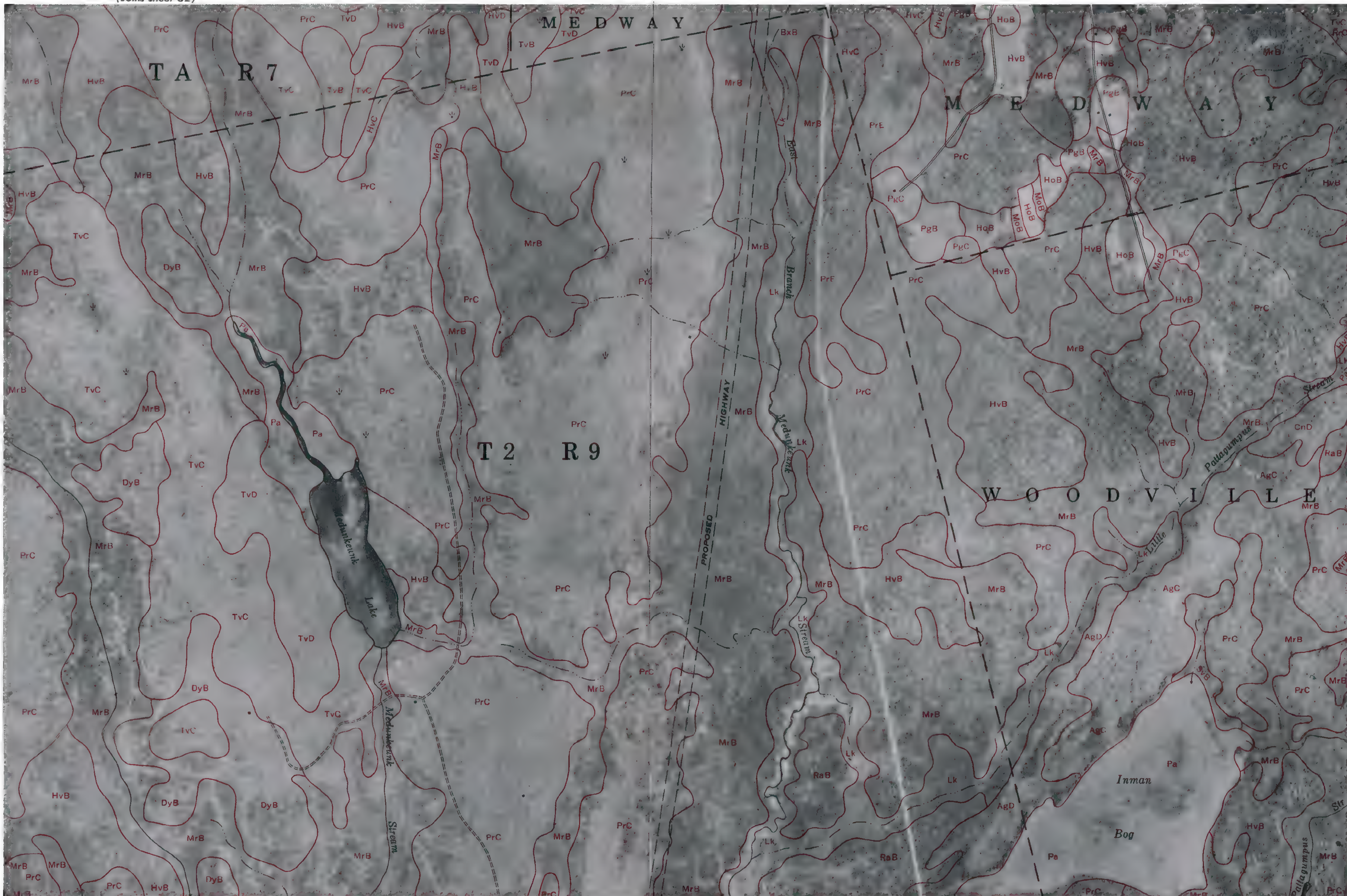


(Joins sheet 92)

0 ½ 1 Mile Scale 1:20 000 0 5000 Feet

(Joins sheet 100)

(Joins sheet 82)



(Joins sheet 101)

Scale 1:20 000

0 ½ 1 Mile

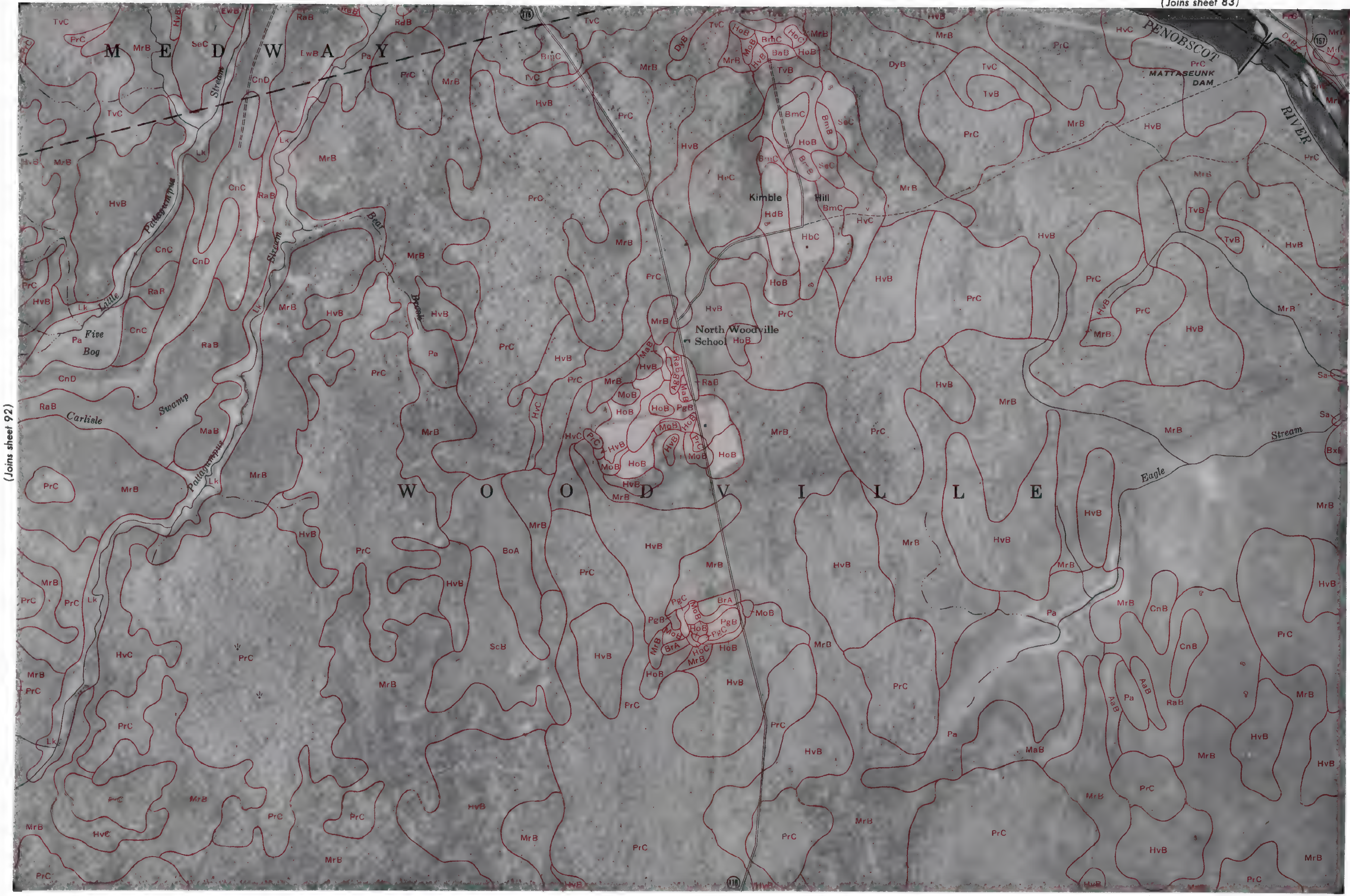
0 5000 Feet

PENOBSCOT COUNTY, MAINE — SHEET NUMBER 93

(93)

(Joins sheet 83)

(Joins sheet 92)



(Joins sheet 94)

(Joins sheet 102)

0 ½ 1 Mile Scale 1:20 000 0 5000 Feet

This map is one of a set compiled in 1962, as part of a soil survey by the Soil Conservation Service, United States Department of Agriculture, and the Maine Agricultural Experiment Station.

94

(Joins sheet 84)

(Joins sheet 93)

(Joins sheet 95)

(Joins sheet 103)

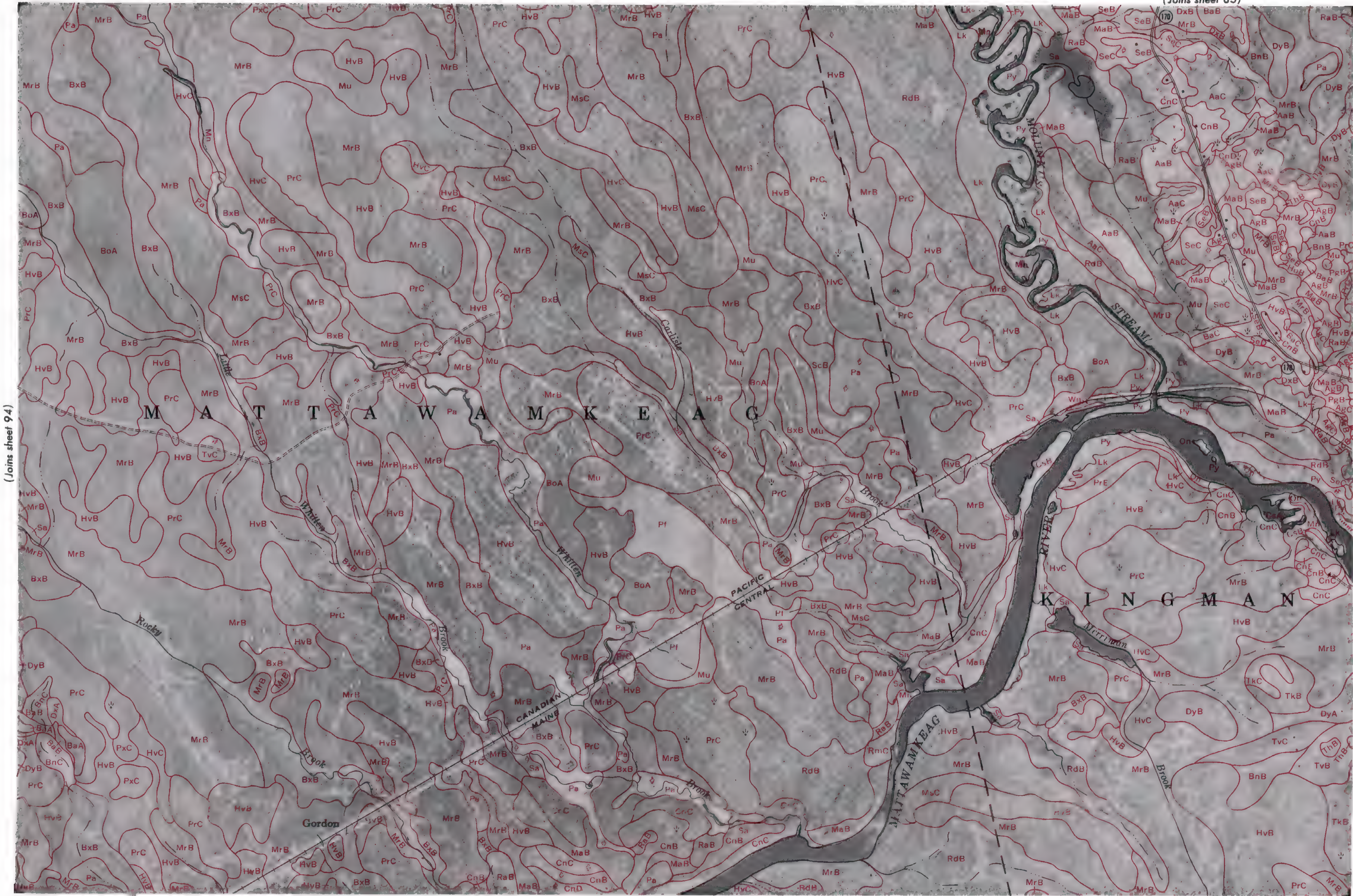
0 ½ 1 Mile Scale 1:20 000 0 5000 Feet

(Joins sheet 85)

95

This map is one of a set compiled in 1962, as part of a soil survey by the Soil Conservation Service, United States Department of Agriculture, and the Maine Agricultural Experiment Station.

(Joins sheet 94)



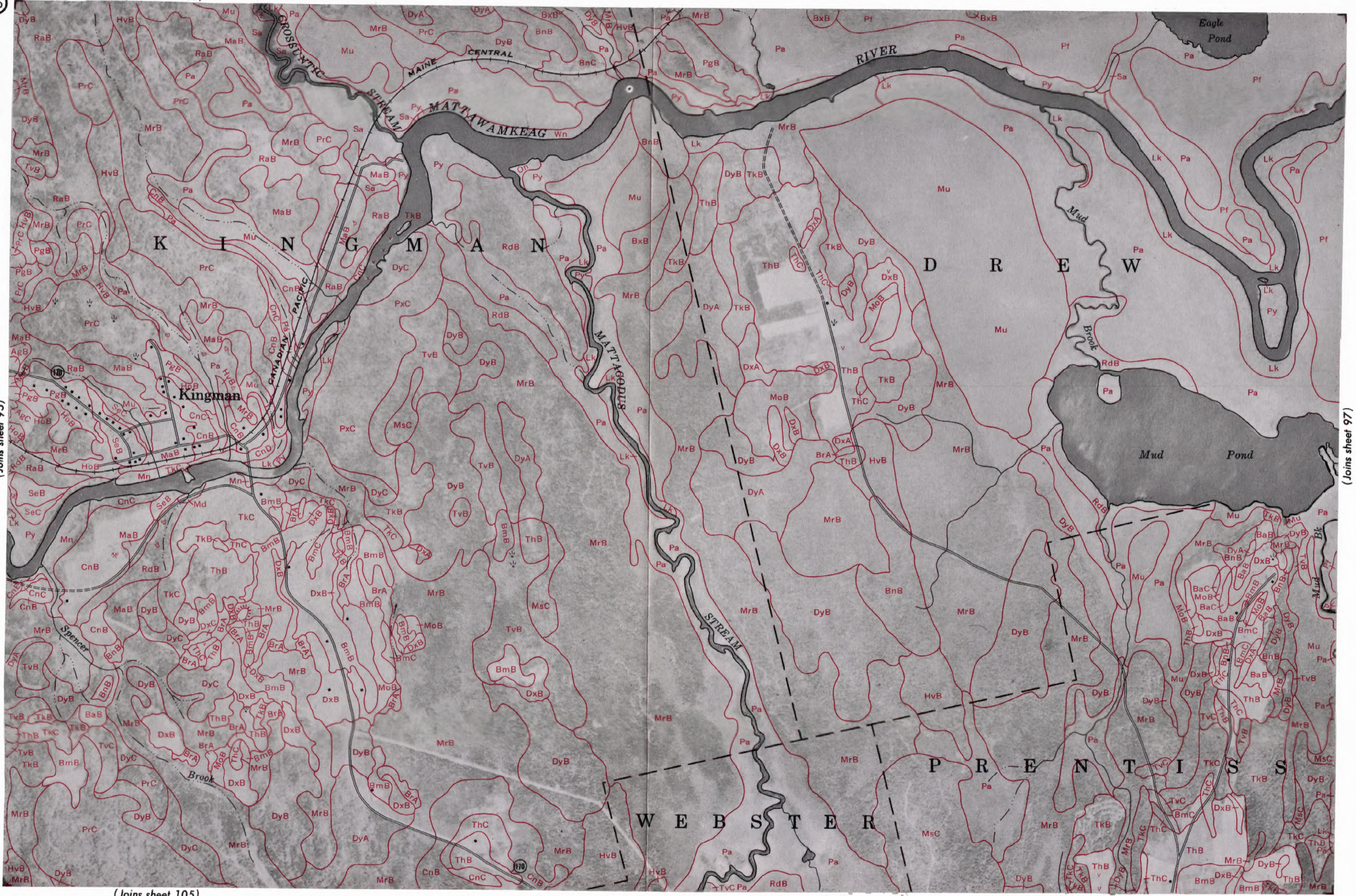
(Joins sheet 96)

(Joins sheet 104)

0 ½ 1 Mile Scale 1:20 000 0 5000 Feet

(Joins sheet 86)

(Joins sheet 95)



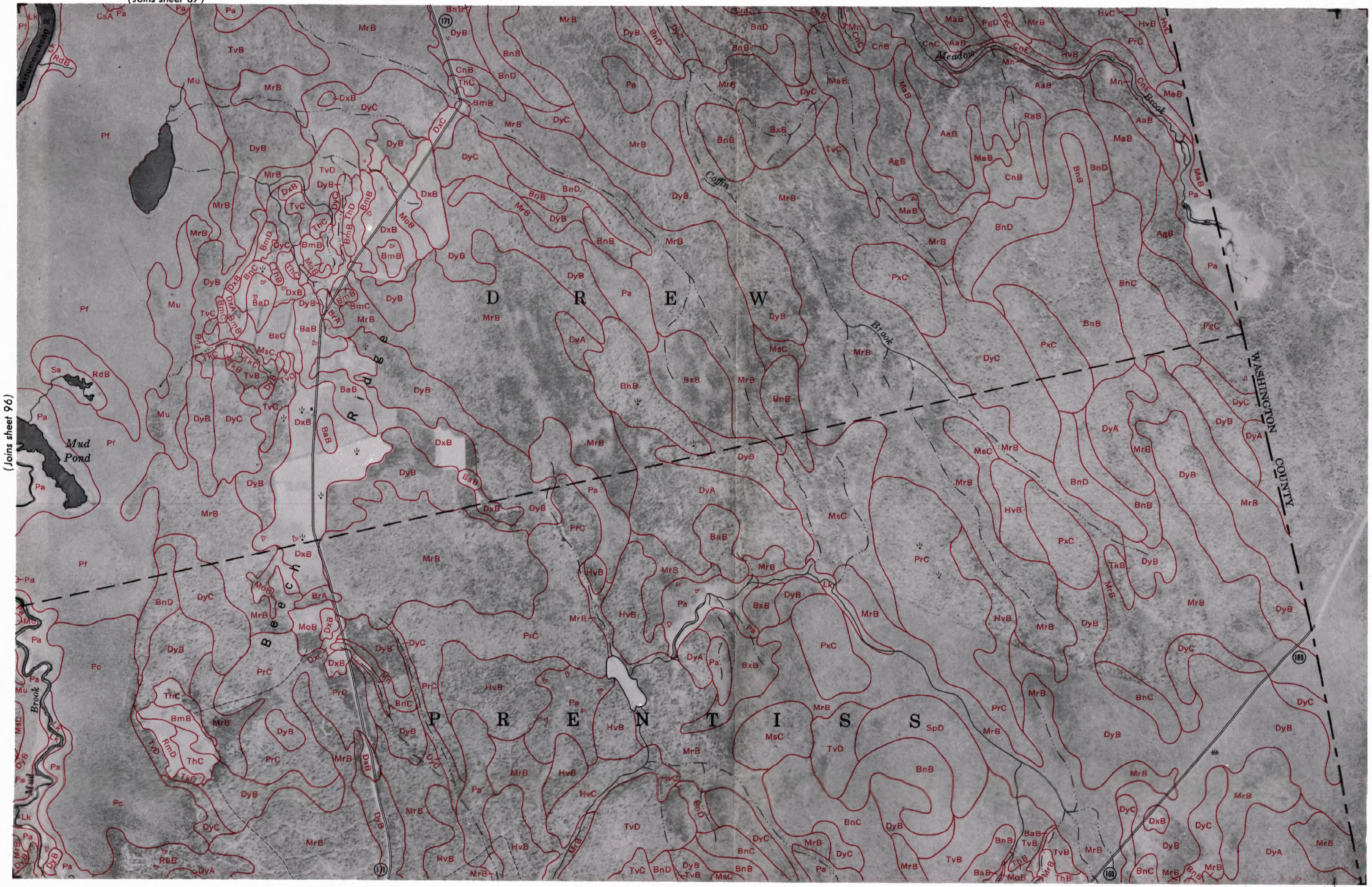
(Joins sheet 97)

(Joins sheet 105)

0 ½ 1 Mile Scale 1:20 000 0 5000 Feet

(Joins sheet 87)

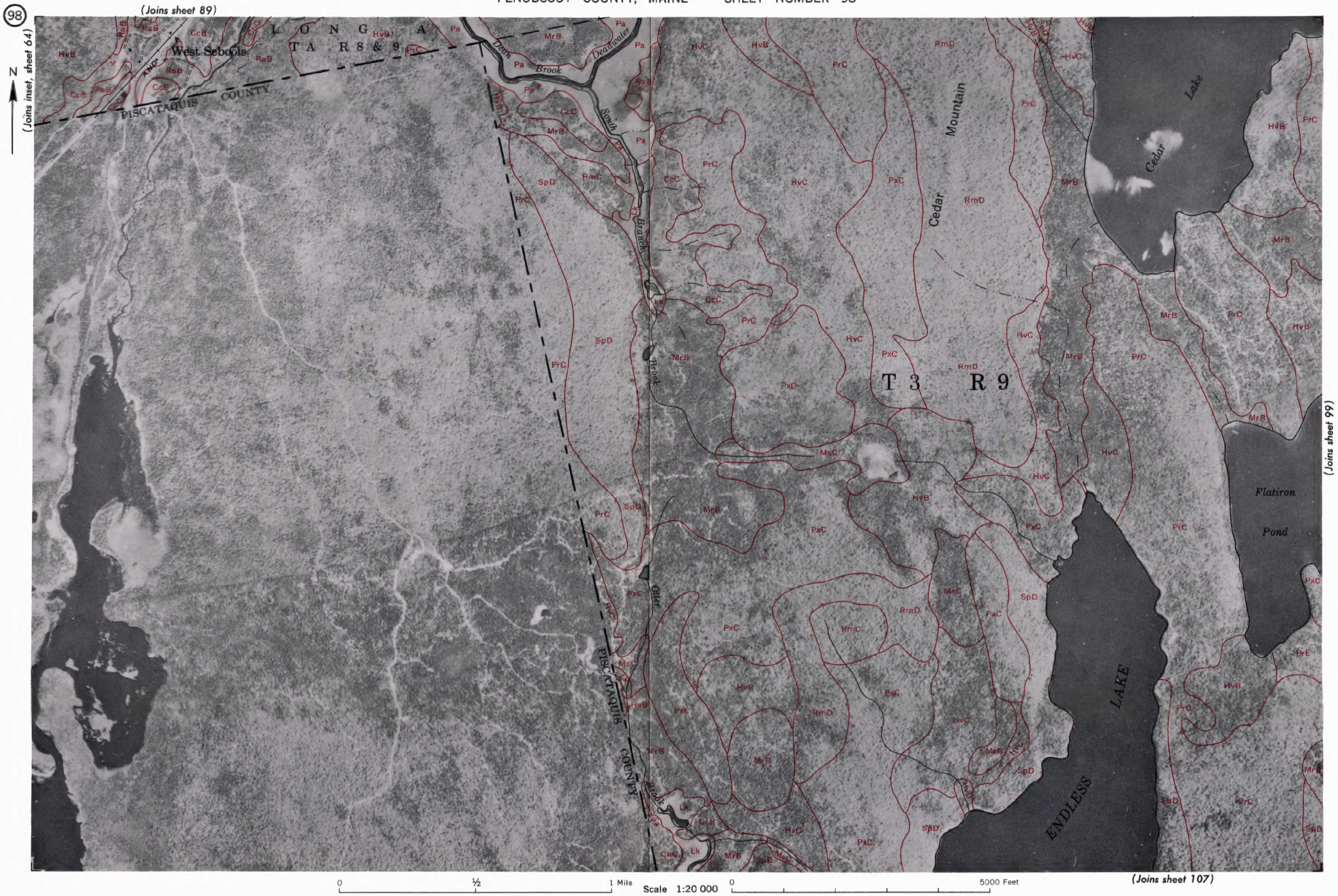
(Joins sheet 96)



0 ½ 1 Mile Scale 1:20 000 0 5000 Feet

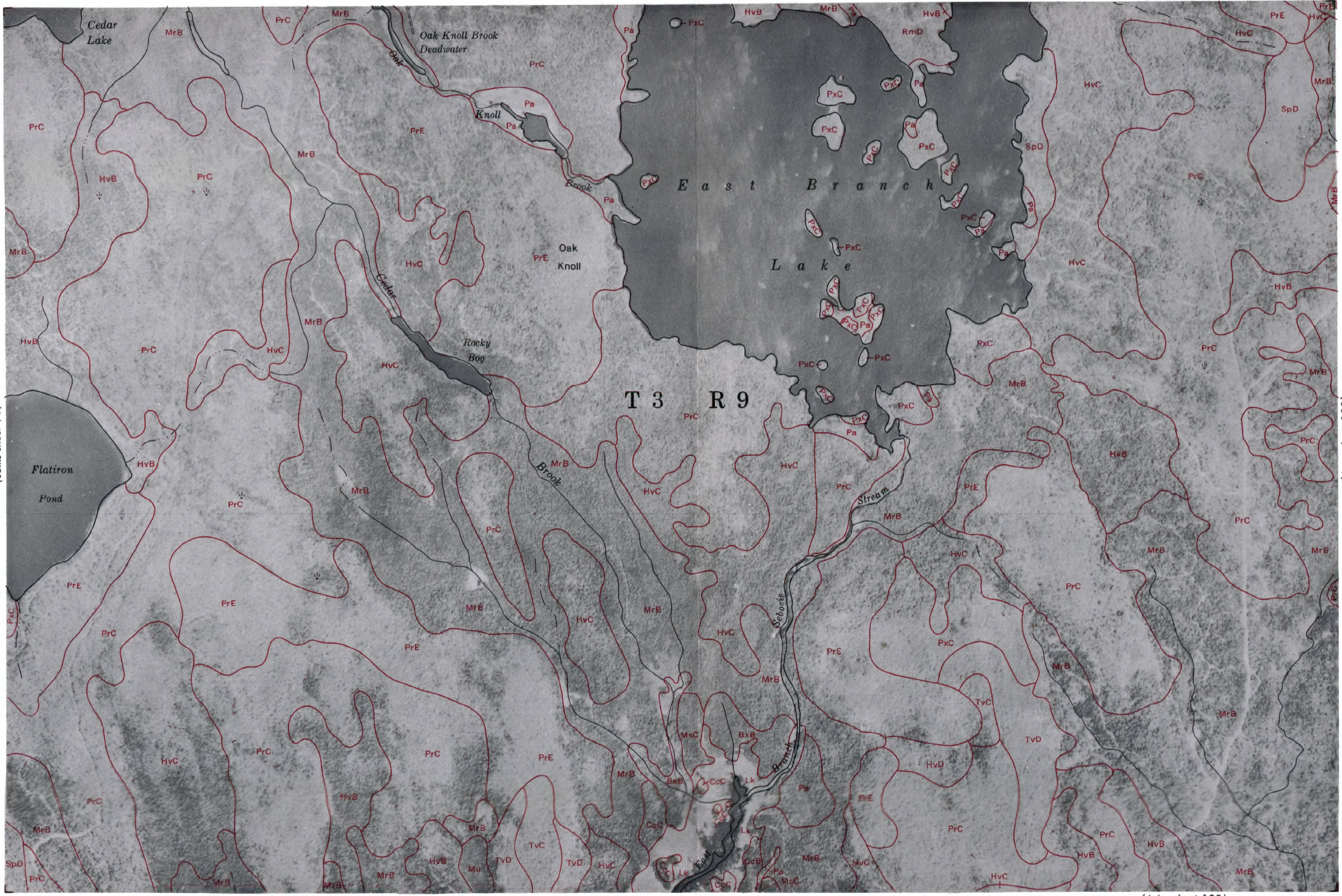
(Joins sheet 106) | (116)

This map is one of a set compiled in 1962, as part of a soil survey by the Soil Conservation Service, United States Department of Agriculture, and the Maine Agricultural Experiment Station.


98
(Joins sheet 89)
(Joins inset, sheet 64)
N
West Seboois
LONG A
TA R8 & 9
PISCATAQUIS COUNTY
Dead Brook
Deadwater
South Branch Brook
Cedar Mountain
Cedar Lake
T 3 R 9
Otter Brook
PISCATAQUIS COUNTY
Flatiron Pond
ENDLESS LAKE
(Joins sheet 99)
(Joins sheet 107)
Scale 1:20 000
0
½
1 Mile
0
5000 Feet

(Joins sheet 90)

(Joins sheet 98)



(Joins sheet 100)

(Joins sheet 108)

0 ½ 1 Mile Scale 1:20 000 0 5000 Feet

This map is one of a set compiled in 1962, as part of a soil survey by the Soil Conservation Service, United States Department of Agriculture, and the Maine Agricultural Experiment Station.